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ABSTRACT

Selected papers are as follows: "Analysis of Factors Used in Student Evaluations of Teaching Effectiveness" (Vaughn et al.); "Assessment of the Readability Level of State Adopted High School Agriculture Textbooks" (Hitchner, Deeds); "Attitudes and Perceptions of Superintendents, Principals, Guidance Counselors, and Agriculture Teachers toward Agricultural Education Reform in Kentucky" (Brannon); "Attrition in North Carolina Secondary School Vocational Agriculture Courses as a Function of Community Characteristics" (Atherton et al.); "Comparison of Community College Vocational-Technical and Transfer Agriculture Students" (Johnson et al.); "Comparison of Teaching Performance among Middle Grade Career Exploration Teachers with Variable Certification Levels and Attributes" (Kirby et al.); "Determination of Statistical Sophistication of Research in Agricultural Education" (Zhang, Burnett); "Differences in Attitudes of Agricultural Education and Other Vocational Education Cooperating Teachers Regarding Student Teaching Expectations" (Flowers); "Early Field Experience Requirements for Preservice Agricultural Education Majors in the United States" (Deeds); "Effectiveness of Computer Assisted Instruction in a Horticulture Plant Identification Class" (Corbett et al.); "Effects of Elevated Temperatures on Reading Comprehension and Task Completion Time in the Agricultural Education Learning Environment" (Jewell et al.); "Factors Influencing Minority and Non-Minority Students to Enroll in an Introductory Agriscience Course in Texas" (Talbert, Larke, Jr.); "Follow-up Study of Graduates from the Master's Programs in Agricultural and Extension Education at Mississippi State University" (Mitchell); "Inservice Education Needs of Teachers of Pilot Agriscience Courses in Mississippi" (Newman, Johnson); "Longitudinal Study of Undergraduate Agriculture Majors" (Taylor, Johnson); "Occupational Status and Educational Needs of College of Agricultural Sciences Graduates" (Wrye, Terry); "Perceptions of Agricultural Biotechnology and Potential Effects on Agricultural Education" (Reels, Arrington); "Perceptions of University Students about Controversial Issues Related to Agriculture" (Terry, Lawver); "Pilot Evaluation of the Biotechnology in Agriculture Curriculum in Oklahoma" (Horne, Key); "Relationships between Selected High School Variables and Collegiate Academic Performance in Agriculture" (Fraze et al.); "Student Teaching Experiences for Teaching Majors in Agricultural Education" (Deeds); "Training Needs of Area Specialized Extension Agents in the North Carolina Cooperative Extension Service" (Gibson, Hillison); and "Who's in Charge Here?" (Moore, Hillison). (KC)

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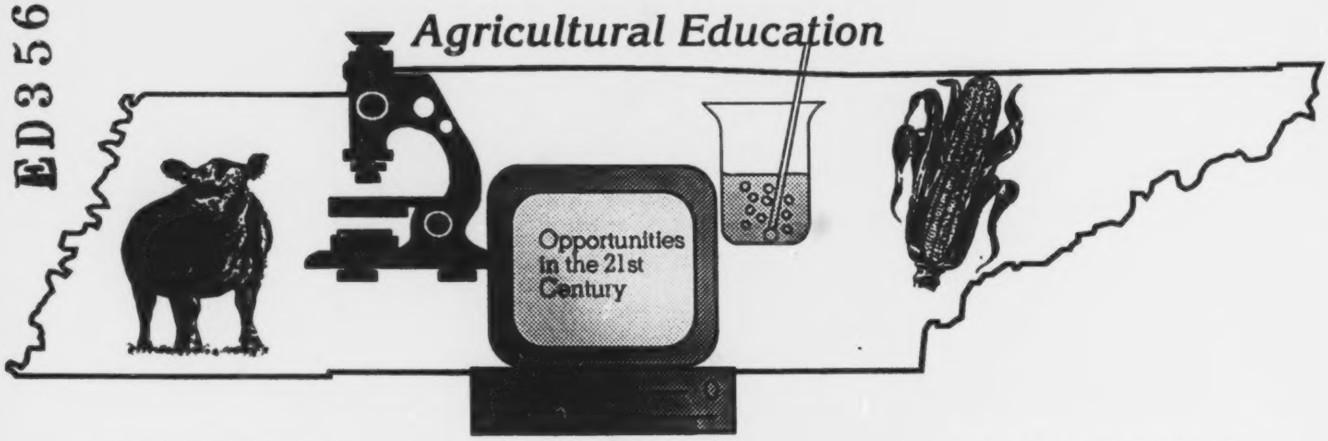
RESEARCH IN AGRICULTURAL EDUCATION


Agricultural Education
Opportunities in the 21st Century

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Proceedings
# of the
Forty-Second Annual
Southern Regional
Agricultural Education
Research Meeting

April 4-5, 1993
Holiday Inn Convention Center
Gatlinburg, Tennessee

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AGRICULTURAL EDUCATION'S OPPORTUNITIES IN THE 21ST CENTURY

PROCEEDINGS

Compiled and Edited

by

Randol G. Waters, Chairman
42nd Annual Southern Agricultural Education
Research Meeting

and

Associate Professor, Agricultural and Extension Education
The University of Tennessee
Knoxville, Tennessee 37901-1071

April 4-5, 1993
Gatlinburg, Tennessee

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ACKNOWLEDGEMENTS

The many hours of planning and hard work that resulted in the 42nd Southern Region Agricultural Education Research Meeting is exemplary of "teamwork in action". More than 100 people contributed to its success. At the onset, more than 60 authors submitted papers for consideration to be presented at the conference. Then, 27 paper reviewers from across the country[1] anonymously read and critiqued the papers and returned them to me for ranking. A total of 36 additional persons (identified in the program) committed to serving as discussants, concurrent session chairs, and facilitators. A sincere **"Thank you"** is offered to all of those persons for their help.

Additionally, I would like to express my personal appreciation to the following people who went "beyond the call of duty" to assure that the conference was a success:

> to Drs. Roy Lessly and Cecil Carter, colleagues in the Department of Agricultural and Extension Education at The University of Tennessee, who assisted with many of the "spur of the moment crises" arising from my inability to do more than two things at once;
>
> to Dr. John Todd, colleague, and Chairman of the overall Agricultural Education Conference, for his assistance with SAERM and a remarkable job of soliciting private donations to help offset conference expenses and keep registration fees to a minimum;
>
> to Mr. Kirk Swortzel, graduate assistant in the Department of Agricultural and Extension Education at The University of Tennessee, for his enthusiasm and commitment to helping with the program and completing so many specific little details that needed attention;
>
> to Ms. Carla Carver, graduate assistant in the Department of Agricultural and Extension Education at The University of Tennessee, for her assistance with conference registration and her help in making my job easier when I was trying to juggle normal day-to-day responsibilities and conference priorities;

---

[1] Paper reviewers were agricultural and extension educators selected from the states of Arizona, Arkansas, California, Florida, Georgia, Kentucky, Louisiana, New Hampshire, North Carolina, Pennsylvania, South Carolina, Tennessee, Texas, Virginia, and West Virginia. Each paper was reviewed by three independent reviewers and an average rating from all three was used in final ranking. Whenever possible, reviewers were sent papers which were within their identified expertise.

to Ms. Mioko Oliver, Principal Secretary in the Department of Agricultural and Extension Education, for her commitment to learning "new computer programs" and assistance with the registration and tracking of papers, and follow-up correspondence with authors;

to Ms. Missy Kitts, Senior Secretary in the Department of Agricultural and Extension Education, for her hard work in correspondence with authors, finalizing the program and proceedings, and her "patience" when I asked her to make changes in yet another version of the "final drafts" before sending them to the printers; and finally,

to my wife for her understanding when I was at the office late at night when I should have been at home, and to my son who I hope will forgive me for missing his second birthday while attending this conference.

One important criterion which can be used to measure the success or failure of any event like the Southern Agricultural Education Research Conference is it's ability to inspire many people to help in a common goal. Based upon the voluntary efforts of all the people I've just mentioned, I believe that we will have a very successful conference.

Randol G. Waters, Chairman
1993 SAERM

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Dr. Nolan Arthur, University of Arkansas
Dr. Mike Barrera, Southern Arkansas University
Dr. Lloyd Blanton, Clemson University
Dr. Stanley Burke, Virginia Tech
Dr. Ben Byler, Tennessee Tech University
Dr. Linda Byler, Tennessee Agricultural Extension Service
Dr. David Coffey, Western Kentucky University
Dr. Donna Graham, University of Arkansas
Dr. John Hillison, Virginia Tech
Dr. Tracy Hoover, University of Florida
Ms. Tracy Murphy, Louisiana State University
Dr. Freddie Scott, University of Arkansas

DISCUSSANTS

Dr. Gary Briers, Texas A&M University
Dr. Carey Ford, Tennessee State University
Dr. Tom Grady, Southwest Texas State University
Dr. Ray V. Herren, University of Georgia
Dr. Donald Johnson, Mississippi State University
Dr. Barbara M. Kirby, North Carolina State University
Dr. Joe Kotrlik, Louisiana State University
Dr. Michael Newman, Mississippi State University
Dr. Glen Shinn, Clemson University
Dr. Robert Terry, Jr., Texas Tech University
Dr. Christine Townsend, Texas A&M University
Dr. George Wardlow, University of Arkansas

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Dr. Richard Poling, Clemson University
Mr. Rick Rudd, Virginia Tech
Mr. Kirk Swortzel, University of Tennessee
Dr. Bill Weeks, Oklahoma State University
Dr. Curtis White, Clemson University

PROGRAM

Chairperson: Randol G. Waters
Vice Chairperson: Joe G. Harper
Secretary: James Flowers

Saturday, April 3, 1993

3:00 p.m.	Conference Headquarters Opens
6:00 p.m. - 8:30 p.m.	Registration/Information

Sunday, April 4, 1993

8:30 a.m. - 5:00 p.m.	Registration
10:15 a.m. - 10:30 a.m.	Session One: *Meeting Overview* Chairperson: Randol Waters
10:30 a.m. - 12:00 p.m.	Session Two Concurrent Session A: Staff Development in Agricultural and Extension Education Concurrent Session B: Undergraduate Students' Perceptions About Agriculture and University Instruction Concurrent Session C: Student Teaching Experiences in Agricultural Education
12:00 p.m. - 1:30 p.m.	Lunch
1:30 p.m. - 3:00 p.m.	Session Three Concurrent Session D: Undergraduate and Post Secondary Student Experiences in Agricultural Education Concurrent Session E: Future Directions in Agricultural and Extension Education Concurrent Session F: History of Agricultural Education
3:00 p.m. - 3:30 p.m.	Refreshment Break

3:30 p.m. - 5:00 p.m.	Session Four Concurrent Session G: High School Agriculture Curriculum Concurrent Session H: Agricultural Mechanics Concurrent Session I: Agricultural Education Student Follow-Up

Monday, April 5, 1993

8:30 a.m. - 10:00 a.m.	Session Five Concurrent Session J: Secondary Agricultural Education Programs Concurrent Session K: Local Community and Institutional Effectiveness in Agricultural Education Concurrent Session L: Curriculum Reform in Agricultural Education
10:00 a.m. - 10:30 a.m.	Refreshment Break
10:30 a.m. - 12:00 p.m.	Session Six: *General Session* Dr. J. Robert Warmbrod, Professor, Department of Agricultural Education, The Ohio State University

CONCURRENT SESSION A

Staff Development in Agricultural and Extension Education

Topic 1: *Training Needs of Area Specialized Extension Agents in the North Carolina Cooperative Extension Service*

Jerry Gibson, Area Specialized Swine Agent, North Carolina Cooperative Extension Service; and John Hillison, Professor, Virginia Tech

Topic 2: *Inservice Education Needs of Teachers of Pilot Agriscience Courses in Mississippi*

Michael E. Newman, Assistant Professor; and Donald M. Johnson, Assistant Professor, Mississippi State University

Topic 3: *An Assessment of Personal, Educational and Professional Development Needs as Perceived by International Graduate Students Enrolled in the College of Agricultural Sciences and Natural Resources at Oklahoma State University*

Altaf Hussain Bhatti, Graduate Student; and James D. White, Professor, Oklahoma State University

Chairperson:	Linda Byler, Tennessee Agricultural Extension Service
Discussant:	Carey Ford, Tennessee State University
Facilitator:	Richard Poling, Clemson University

CONCURRENT SESSION B

Undergraduate Students' Perceptions About Agriculture and University Instruction

Topic 1: *Analysis of Factors Used in Student Evaluations of Teaching Effectiveness*

Paul R. Vaughn, Professor and Chair; Robert Terry, Jr., Assistant Professor; and Marvin Cepica, Associate Dean, Texas Tech University

Topic 2: *Perceptions of University Students About Controversial Issues Related to Agriculture*

Robert Terry, Jr., Assistant Professor; and David E. Lawver, Assistant Professor, Texas Tech University

Topic 3: *The Effectiveness of Computer Assisted Instruction in a Horticulture Plant Identification Class*

Mona Rae Corbett, M.S.; Christine D. Townsend, Associate Professor; and Jayne M. Zajicek, Texas A&M University

Chairperson: Mike Barrera, Southern Arkansas University

Discussant: Barbara M. Kirby, North Carolina State University

Facilitator: Richard Norris, Southern Arkansas University

CONCURRENT SESSION C

Student Teaching Experiences in Agricultural Education

Topic 1: *Early Field Experience Requirements for Pre-Service Agricultural Education Majors in the United States*

Jacquelyn P. Deeds, Associate Professor, Mississippi State University

Topic 2: *Student Teaching Experiences for Teaching Majors in Agricultural Education: A National Study*

Jacquelyn P. Deeds, Associate Professor, Mississippi State University

Topic 3: *Differences in Attitudes of Agricultural Education and Other Vocational Education Cooperating Teachers Regarding Student Teaching Expectations*

James Flowers, Associate Professor, North Carolina State University

Chairperson: Tracy Murphy, Louisiana State University

Discussant: Gary Briers, Texas A&M University

Facilitator: Kirk Swortzel, University of Tennessee

CONCURRENT SESSION D

Undergraduate and Post Secondary Student Experiences in Agricultural Education

Topic 1: *Relationships Between Selected High School Variables and Collegiate Academic Performance in Agriculture*

Steve Fraze, Assistant Professor; Toby Miller, Graduate Student; David E. Lawver, Assistant Professor; and Paul R. Vaughn, Professor, Texas Tech University

Topic 2: *A Comparison of Community College Vocational-Technical and Transfer Agriculture Students*

Donald M. Johnson, Assistant Professor; and Walter N. Taylor, Associate Professor, Mississippi State University; and Thad O. Owens, Jr., Hinds Community College

Topic 3: *Field Experiences Requirements for Non-Teaching Agricultural Education Majors in the United States*

Jacquelyn P. Deeds, Associate Professor, Mississippi State University

Chairperson: Ben Byler, Tennessee Tech University

Discussant: Joe Kotrlik, Louisiana State University

Facilitator: Willie Cheatham, Alabama A&M University

CONCURRENT SESSION E

Future Directions in Agricultural and Extension Education

Topic 1: *The Determination of Statistical Sophistication of Research in Agricultural Education*

Chi Zhang, Assistant Professor, University of Delaware; and Michael F. Burnett, Professor and Acting Chair, Louisiana State University

Topic 2: *A Comparison of Teaching Performance Among Middle Grade Career Exploration Teachers with Variable Certification Levels and Attributes*

Barbara M. Kirby, Associate Professor; and Larry R. Jewell, Associate Professor, North Carolina State University; and J. David Edwards, Education Consultant, North Carolina Department of Public Instruction

Topic 3: *Perceptions of Agricultural Biotechnology and Potential Effects on Agricultural Education*

Paul Reese, 4-H & Youth Development Agent, Ohio Cooperative Extension Service; and Larry R. Arrington, Professor and District Director, University of Florida

Chairperson:	Nolan Arthur, University of Arkansas
Discussant:	George Wardlow, University of Arkansas
Facilitator:	Bill Weeks, Oklahoma State University

CONCURRENT SESSION F

History of Agricultural Education

Topic 1: *Who's in Charge Here? An Analysis of the Leadership in Agricultural Education Provided by the United States Department of Agriculture*

Gary E. Moore, Professor, North Carolina State University; and John Hillison, Professor, Virginia Tech

Topic 2: *Who's in Charge Here? An Analysis of the Leadership in Agricultural Education Provided by the United States Department of Education*

Gary E. Moore, Professor, North Carolina State University; and John Hillison, Professor, Virginia Tech

Topic 3: *Who's in Charge Here? An Analysis of the Leadership in Agricultural Education Provided by the Federal Board for Vocational Education*

Gary E. Moore, Professor, North Carolina State University; and John Hillison, Professor, Virginia Tech

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Gary E. Moore, Professor, North Carolina State University; and John Hillison, Professor, Virginia Tech

Chairperson: David Coffey, Western Kentucky University

Discussant: Ray Herren, University of Georgia

Facilitator: Melissa Lester, Texas A&M University

CONCURRENT SESSION G

High School Agriculture Curriculum

Topic 1: *Pilot Evaluation of the Biotechnology in Agriculture Curriculum in Oklahoma: A Progress Report*

Jeffrey W. Horne and James P. Key, Professor, Oklahoma State University

Topic 2: *The Future of the Broiler Industry in the 21st Century with Implications for Agricultural Education*

Tony M. Embrick, Teacher of Agriculture, Jackson County High School; and Maynard J. Iverson, Associate Professor and Head, University of Georgia

Topic 3: *Characteristics of the Dairy Industry in the 21st Century with Implications for Curriculum Development in Agricultural Education*

Gearl M. Collins, Jr., Research Associate; and Maynard J. Iverson, Associate Professor and Head, University of Georgia

Chairperson: John Hillison, Virginia Tech

Discussant: Michael Newman, Mississippi State University

Facilitator: Carla Carver, University of Tennessee

CONCURRENT SESSION H

Agricultural Mechanics

Topic 1: *Noise Levels of Selected Secondary Agricultural Mechanics Laboratories*

Brent Besler, Graduate Research Assistant; David E. Lawver, Assistant Professor; and Steve Fraze, Assistant Professor, Texas Tech University

Topic 2: *A Three-Year Study of Student Achievement and Factors Related to Achievement in a State FFA Agricultural Mechanics Contest*

Donald M. Johnson, Assistant Professor, Mississippi State University

Topic 3: *Safety Compliance of Selected Secondary Agricultural Mechanics Laboratories*

Shahran Kasim, Graduate Student; David E. Lawver, Assistant Professor; and Steve Fraze, Assistant Professor, Texas Tech University

Chairperson: Stanley Burke, Virginia Tech

Discussant: Glen Shinn, Clemson University

Facilitator: Curtis White, Clemson University

CONCURRENT SESSION I

Agricultural Education Student Follow-Up

Topic 1: *Occupational Status and Educational Needs of College of Agricultural Sciences Graduates*

Cynthia Wrye, M.S.; and Robert Terry, Jr., Assistant Professor, Texas Tech University

Topic 2: *Longitudinal Study of Undergraduate Agriculture Majors: 1977, 1982, 1987 and 1992*

Walter N. Taylor, Associate Professor; and Donald M. Johnson, Assistant Professor, Mississippi State University

Topic 3: *A Follow-Up Study of the Graduates from the Master's Programs in Agricultural and Extension Education at Mississippi State University*

David G. Mitchell, Doctoral Student, Mississippi State University

Chairperson: Tracy Hoover, University of Florida

Discussant: Tom Grady, Southwest Texas State University

Facilitator: Farish Mulkey, Jr., Texas A&M University

CONCURRENT SESSION J

Secondary Agricultural Education Programs

Topic 1: *An Assessment of the Readability Level of State Adopted High School Agriculture Textbooks*

Mary G. Hitchner, Graduate Student; and Jacquelyn P. Deeds, Associate Professor, Mississippi State University

Topic 2: *The Effects of Elevated Temperatures on Reading Comprehension and Task Completion Time in the Agricultural Education Learning Environment*

Larry R. Jewell, Associate Professor; and Barbara M. Kirby, Associate Professor, North Carolina State University; and R. Lane Gregory, Angier, North Carolina

Topic 3: *Southern Region Readership Survey of the FFA New Horizons Magazine*

James Connors, Ph.D.; and Jack Elliot, Assistant Professor, University of Arizona; and Dave Krueger, Graduate Research Assistant, Michigan State University

Chairperson: Freddie Scott, University of Arkansas

Discussant: Christine Townsend, Texas A&M University

Facilitator: Rick Rudd, Virginia Tech

CONCURRENT SESSION K

Local Community and Institutional Effectiveness in Agricultural Education

Topic 1: *A Comparison of the Perceptions of Students, Instructors, Administrators, and Advisory Committee Members Regarding the Factors that Contribute to Institutional Effectiveness*

Richard Joerger, Lecturer, University of Wisconsin-Madison; George Wardlow, Associate Professor, University of Arkansas; and Gordon Swanson, Professor Emeritus, University of Minnesota

Topic 2: *Factors Influencing Minority and Non-Minority Students to Enroll in an Introductory Agriscience Course in Texas*

B. Allen Talbert, Visiting Assistant Professor; and Alvin Larke Jr., Associate Professor, Texas A&M University

Topic 3: *Attrition in North Carolina Secondary School Vocational Agriculture Courses as a Function of Community Characteristics*

R. J. Atherton, John K. Coster, Professor; and Gary E. Moore, Professor, North Carolina State University

Chairperson: Donna Graham, University of Arkansas

Discussant: Donald Johnson, Mississippi State University

Facilitator: Brad Dodson, Texas A&M University

CONCURRENT SESSION L

Curriculum Reform in Agricultural Education

Topic 1: *Perceptions of Georgia High School Agricultural Education Instructors Regarding the Hunter Education Program*

James Corbett, Agricultural Education Instructor, Lowndes Middle School; and Ray V. Herren, Associate Professor, University of Georgia

Topic 2: *The Importance of Selected Mathematics Concepts/Skills and Applications as Perceived by Mississippi High School Agriscience and Mathematics Teachers for the Introduction to Agriscience Curriculum*

James N. Butler, Jr., Graduate Teaching Assistant; and Jasper S. Lee, Professor, Mississippi State University

Topic 3: *Attitudes and Perceptions of Superintendents, Principals, Guidance Counselors, and Agriculture Teachers Toward Agricultural Education Reform in Kentucky*

Tony L. Brannon, Assistant Professor, Murray State University

Chairperson: Lloyd Blanton, Clemson University

Discussant: Robert Terry, Jr., Texas Tech University

Facilitator: Jon Atherton, Clemson University

Papers Presented at the 42nd Annual Southern Agricultural Education Research Meeting

ANALYSIS OF FACTORS USED IN STUDENT EVALUATIONS OF TEACHING EFFECTIVENESS

by

Paul R. Vaughn, Ph.D.
Professor and Chair

Robert Terry, Jr., Ph.D.
Assistant Professor

and

Marvin Cepica, Ed.D.
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INTRODUCTION AND THEORETICAL FRAMEWORK

Student evaluations of instructors are conducted each term at most colleges and universities throughout the nation. The primary purposes of these procedures are to provide feedback for the improvement of teaching, to serve as a criteria for evaluation of faculty by administrators, and in some cases, to help students select instructors for future classes (Tom, Swanson, Abbott, & Cajocum, 1990).

In designing instruments for student evaluation of teaching performance, universities have often utilized a number of broad areas in which students evaluate the teaching performance of their professors. Many of these areas come from research studies which have identified teacher characteristics which are positively related to student performance. Common areas which have been identified include: (1) enthusiasm of the teacher, (2) teacher interaction with students, (3) organization, (4) clarity, and (5) presentation techniques (Rouch, 1983; Van Giffen, 1990; Fandt & Stevens, 1991).

Even though these characteristics come from an established research base, student evaluations are often criticized by faculty and others as measures of teaching effectiveness. Milner (1991) argued that student evaluations of faculty are superficial and prevent the integration of quality in technical information and teaching methodology. Frequent complaints by faculty of student evaluation instruments include the following statements:

(1) "Teachers who give low grades will receive lower evaluations,"

(2) "Students taking elective courses will rate the teacher higher than students who are required to take the course,"

(3) "Students will rate teachers differently according to student gender,"

(4) "Students taking a course within their major will rate a professor higher than students taking a course outside their major",

(5) Students taking a course pass/fail will score an instructor higher than students who take the course for grade,"

(6) Students with low GPA's will rate teachers lower than students with high GPA's," and

(7) "College classification (Freshman, Junior, Graduate Student, etc.) will influence teacher ratings."

Critics of student evaluations charge that these factors must be taken into account before student evaluations can be used as valid measures of teaching effectiveness. (Rouch, 1983). However, Albanese, Schuldt, Case and Brown (1991) as well as McKeachie (1965) maintain that student evaluations are effective measures of teaching excellence.

PURPOSE AND OBJECTIVES

The purpose of this research project was to determine the answer to three questions:

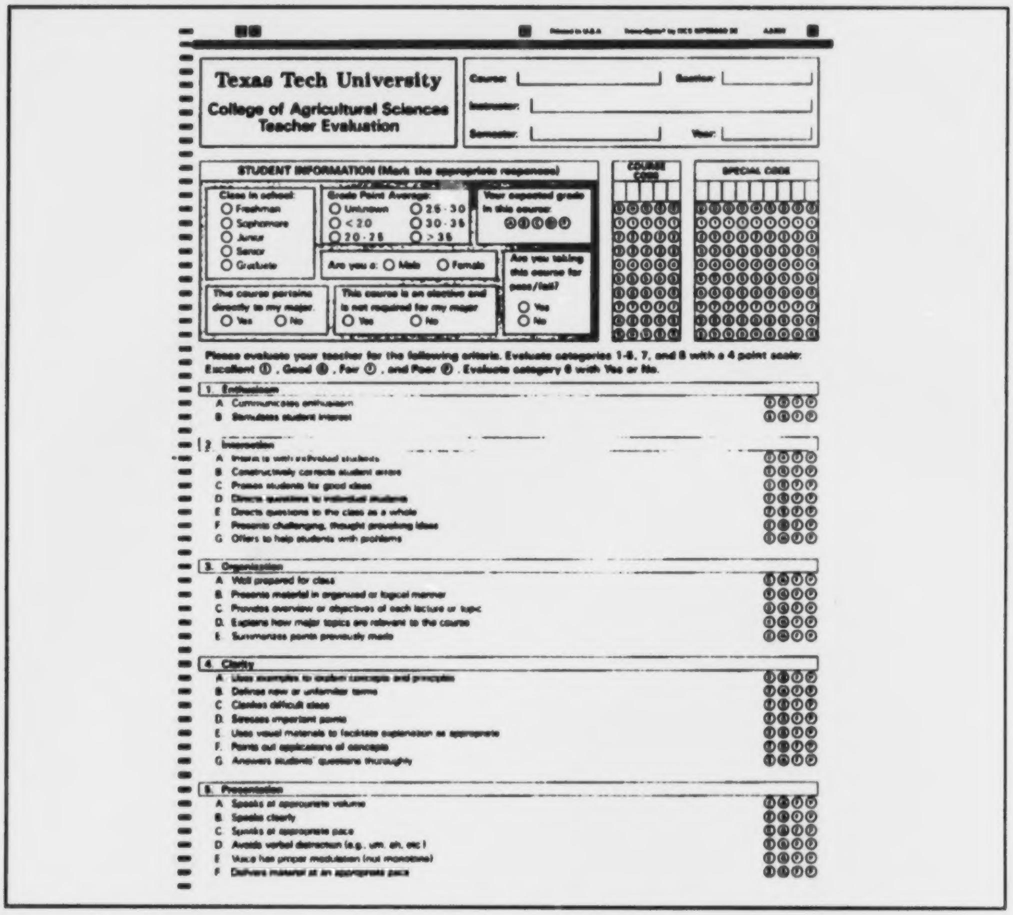
1. Do factors such as student academic achievement, student grade expectations, student gender, student classification type of course (elective or required) status of course (graded, or pass/fail) affect student rating of teachers?

2. Are the factors listed in question one associated with the variance in teacher rating scores?

3. Can the student evaluation form designed and used by the College of Agricultural Sciences at Texas Tech University be considered valid without taking into account these factors?

METHODS AND PROCEDURES

Data used in the study came from a student evaluation form designed and administered specifically for the College of Agricultural Sciences (see Figure 1). The form asked a series of questions related to: (1) teacher enthusiasm, (2) teacher-student interaction, (3) teacher organization, (4) teacher clarity, (5) teacher presentation techniques, (6) conduciveness of the classroom to learning, and (7) overall course rating. For analysis purposes, a composite mean score for each area was computed by the researchers. The data collected came from slightly over 2,400 instruments which were administered during the Fall and Spring Semesters of the 1991 calendar year.



Printed in U.S.A.

Texas Tech University
College of Agricultural Sciences
Teacher Evaluation

Course: ______ Section: ______
Instructor: ______
Semester: ______ Year: ______

STUDENT INFORMATION (Mark the appropriate responses)

Class in school:
○ Freshman
○ Sophomore
○ Junior
○ Senior
○ Graduate

Grade Point Average:
○ Unknown ○ 2.5 - 3.0
○ < 2.0 ○ 3.0 - 3.5
○ 2.0 - 2.5 ○ > 3.5

Your expected grade in this course:

Are you a: ○ Male ○ Female

Are you taking this course for pass/fail?
○ Yes
○ No

The course pertains directly to my major.
○ Yes ○ No

This course is an elective and is not required for my major
○ Yes ○ No

COURSE CODE

SPECIAL CODE

Please evaluate your teacher for the following criteria. Evaluate categories 1-5, 7, and 8 with a 4 point scale: Excellent ○ , Good ● , Fair ○ , and Poor ○ . Evaluate category 6 with Yes or No.

1. Enthusiasm
A Communicates enthusiasm
B Stimulates student interest

2. Interaction
A Interacts with individual students
B Constructively corrects student errors
C Praises students for good ideas
D Directs questions to individual students
E Directs questions to the class as a whole
F Presents challenging, thought provoking ideas
G Offers to help students with problems

3. Organization
A Well prepared for class
B Presents material in organized or logical manner
C Provides overview or objectives of each lecture or topic
D Explains how major topics are relevant to the course
E Summarizes points previously made

4. Clarity
A Uses examples to explain concepts and principles
B Defines new or unfamiliar terms
C Clarifies difficult ideas
D Stresses important points
E Uses visual materials to facilitate explanation as appropriate
F Points out applications of concepts
G Answers students' questions thoroughly

5. Presentation
A Speaks at appropriate volume
B Speaks clearly
C Speaks at appropriate pace
D Avoids verbal distraction (e.g., um, ah, etc.)
E Voice has proper modulation (not monotone)
F Delivers material at an appropriate pace

Figure 1: Teacher evaluation instrument for the College of Agricutlural Sciences at Texas Tech University

RESULTS

Descriptive Data

In reviewing the characteristics of the students involved in the study, several interesting factors surfaced. The first was that most students had high expectations. Over 80% of the students indicated they expected an A or B. Less than one percent of the students expected to receive an F.

Students also indicated that most of the courses they were taking pertained directly to their major and were not being taken as electives. Approximately three-fourths of the students marked this choice on the evaluation form.

Slightly over one-fourth of the students were female and less than three percent of the students took the courses under the pass/fail option.

Relationships

A stepwise, multiple regression was performed on enthusiasm, interaction with students, organization, clarity, presentation techniques, and course overview scores using seven independent variables: (1) expected grade, (2) college classification, (3) gender, (4) GPA, (5) if course was an elective, (6) whether course was taken as pass/fail, and (7) whether course was related to major as independent variables. A separate analysis was performed for the fall and spring semester to determine if similar results could be obtained.

Summary of the multiple regression analyses for each factor are illustrated in Tables 1 - 7. Although analyses for the fall and spring semesters varied slightly, results of the summary tables can be summarized as follows:

- The most variance in teacher rating that was explained by any combination of the variables was 12.9 %. Put another away, at least 87 % of the variance in teacher rating scores was due to variables other than the ones included in this study. The most variance accounted for by any one variable was 10.0 %.
- At some point, every independent variable that was included in the study entered a regression equation and could be used to explain a portion of the variance in teacher rating scores. However, with the exception of expected grade, the amount of variance in teaching rating that could be accounted for by any independent variable was extremely small (less than 2%). Several specific findings included:
    - When gender entered any of the regression equations, it was found that females rated the teacher lower than males.
    - When GPA entered any of the regression equations, it revealed that students with higher GPA's tended to rate teachers lower than students with lower GPA's.
    - In the equations where the variable entered the regression equation, it was discovered that students who took a course as an elective, or took the course pass/fail, or indicated the course was related to their major, rated the teacher higher than did students who did not take the course as an elective, or did not take the course pass/fail, or felt the course was not related to their major.

- When college class entered any of the regression equations, it indicated that students with lower classifications (such as Freshman) rated teachers higher than did students with higher classifications (such as Seniors).

- In all the regression equations, expected grade explained the most variance in the teacher rating scores. Students who expected to receive a high grade rated the teacher higher than students who expected a lower grade. However, the amount of variance explained for in teacher rating by expected grade was low. The portion ranged from a low of 6.8% to a high of 10.0 %.

Table 1: Stepwise multiple regression of selected variables on student evaluation scores by teacher enthusiasm.

Semester/ Independent Variable	R	R^2	R^2 Change	F
Spring 1991				
Expected Grade	.2607	.0681	.0681	126.91*
Elective Course	.2831	.0801	.0120	75.63*
Gender	2920	.0853	.0052	53.93*
GPA	.3013	.0908	.0055	43.30*
For Major	.3069	.0942	.0034	36.03*
Fall 1991				
Expected Grade	.2892	.0837	.0837	194.53*
Elective Course	.3074	.0945	.108	111.15*
GPA	.3182	.1013	.0068	79.97*
Gender	.3247	.1054	.0041	62.68*
Pass	.3303	.1091	.0037	52.10*
For Major	.3334	.1111	.0020	44.30*

* $p = < .05$

Table 2: Stepwise multiple regression of selected variables on student evaluation scores by teacher interaction with students.

Semester/ Independent Variable	R	R^2	R^2 Change	F
Spring 1991				
Expected Grade	.2517	.0633	.0633	115.98*
Gender	.2649	.0701	.0068	64.65*
GPA	.2783	.0775	.0074	47.95*
For Major	.2839	.0806	.0031	37.52*
Elective Course	.3017	.0910	.0104	34.27*
Fall 1991				
Expected Grade	.2979	.0888	.0888	204.95*
GPA	.3066	.0940	.0052	109.07*
Elective Course	.3093	.0957	.0017	74.12*
For Major	.3144	.0989	.0032	57.63*

* $p = < .05$

Table 3: Stepwise multiple regression of selected variables on student evaluation scores by teacher organization.

Semester/ Independent Variable	R	R^2	R^2 Change	F
Spring 1991				
Expected Grade	.2376	.0564	.0564	103.47*
Gender	.2632	.0693	.0129	64.35*
GPA	.2862	.0819	.0126	51.37*
Elective Course	.2904	.0844	.0025	39.78*
For Major	.2943	.0866	.0022	32.73*
Fall 1991				
Expected Grade	.2464	.0607	.0607	136.72*
Classification	.2732	.0747	.0140	85.31*
Gender	.2857	.0816	.0069	62.63*
GPA	.2936	.0862	.0046	49.841*
Elective Course	.2985	.0891	.0029	41.315*
For Major	.3026	.0916	.0025	35.472*

* $p = < .05$

Table 4: Stepwise multiple regression of selected variables on student evaluation scores by teacher clarity.

Semester/ Independent Variable	R	R^2	R^2 Change	F
Spring 1991				
Expected Grade	.2772	.0768	.0768	143.64*
Gender	.3053	.0932	.0164	88.69*
GPA	.3185	.1014	.0082	64.86*
Elective Course	.3282	.1077	.0063	52.02*
For Major	.3314	.1099	.0022	42.50*
Fall 1991				
Expected Grade	.2907	.0845	.0845	195.68*
Gender	.3089	.0945	.0100	111.76*
Elective Course	.3238	.1048	.0103	82.67*
GPA	.3341	.1117	.0069	66.52*
Classification	.3398	.1155	.0038	55.24*
For Major	.3437	.1181	.0026	47.21*

* $p = < .05$

Table 5: Stepwise multiple regression of selected variables on student evaluation scores by teacher presentation techniques.

Semester/ Independent Variable	R	R^2	R^2 Change	F
Spring 1991				
Expected Grade	.2169	.0470	.0470	85.41*
Gender	.2590	.0671	.0201	62.17*
Elective Course	.2726	.0743	.0072	46.25*
GPA	.2791	.0779	.0036	36.47*

Table 5: (Continued)

Semester/ Independent Variable	R	R^2	R^2 Change	F
Fall 1991				
Expected Grade	.2425	.0588	.0588	132.33*
GPA	.2611	.0682	.0094	77.42*
Gender	.2784	.0775	.0093	59.24*
Elective Course	.2917	.0851	.0076	49.15*
For Major	.2958	.0875	.0024	40.54*

* p = < .05

Table 6: Stepwise multiple regression of selected variables on student evaluation scores by classroom conducive to learning.

Semester/ Independent Variable	R	R^2	R^2 Change	F
Spring 1991				
Expected Grade	.1823	.0332	.0332	58.42*
Class	.2041	.0417	.0085	36.92*
Elective Course	.2197	.0483	.0066	28.70*
Fall 1991				
Expected Grade	1966	.0387	.0387	82.60*
Class	.2298	.0528	.0141	57.21*
GPA	.2466	.0608	.0080	44.30*
Gender	.2603	.0678	.0070	37.28*
Elective Course	.2645	.0700	.0022	30.85*

* p = < .05

Table 7: Stepwise multiple regression of selected variables on student evaluation scores by course overview.

Semester/ Independent Variable	R	R^2	R^2 Change	F
Spring 1991				
Expected Grade	.3169	.1004	.1004	191.65*
GPA	.3321	.1103	.0099	106.39*
Gender	.3387	.1147	.0044	74.08*
For Major	.3428	.1175	.0028	57.05*
Elective Course	.3555	.1264	.0089	49.57*
Fall 1991				
Expected Grade	.3101	.0961	.0961	219.76*
Classification	.3297	.1087	.0126	125.90*
GPA	.3387	.1147	.0060	89.14*
Gender	.3490	.1218	.0071	71.51*
Elective Course	.3530	.1246	.0028	58.71*
For Major	.3590	.1289	.0043	50.82*

* p = < .05

CONCLUSIONS AND RECOMMENDATIONS

Based upon the findings of the study, the researchers make the following conclusions and recommendations concerning the student evaluation form used to evaluate teachers in the College of Agricultural Sciences at Texas Tech University:

1. None of the variables thought to affect student ratings of teachers have a strong influence on teacher rating. In most instances, over 90% of the variance in the teacher's rating can be attributed to factors other than those included in this study. The obvious conclusion is that these variables, for the most part, have little effect on the overall rating of the teacher by the students.

2. Of the variables studied, the one with the greatest influence on teacher rating is expected grade. However, the influence it contributes toward the total rating of the teacher is small.

3. Although there are other factors which could affect the validity of the student evaluation form, the lack of strong influence on teacher rating by these variables strengthens the validity of the current evaluation form which is being used. It is recommended that the information currently being collected on the form related to: (1) expected grade, (2) gender, (3) college classification, (4) whether the course is being taken as pass/fail (5) if the course is an elective, or (6) if the course is required for the major be eliminated from the form. There is little to be gained by including this information.

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ANALYSIS OF FACTORS USED IN STUDENT EVALUATIONS OF TEACHING EFFECTIVENESS

A Critique

Barbara M. Kirby, North Carolina State University

The collaboration of faculty from various levels of academic status signals to the reader that this is an important topic for discussion at the university. The introduction to the study establishes yet another university's rationale for studying student situational variables and attempting to determine if these factors influence student ratings of teachers. The literature does not give very much credence to these factors. However, the last time I received a low evaluation I wanted to attribute it to student classification. I know that was not the case. We spend a lot of our research time dispelling charges that these factors are important. I realize that with the senility associated with faculty evaluations, each institution must be confident that in fact their evaluation form is appropriate.

The purpose and objectives of the study were clearly stated. Several questions arose from the methods and procedures section. Figure 1 takes up a lot of space but clearly display the evaluation categories and student factors. More information about the validate and reliability of the instrument needs to be explained so that the reader can eliminate testing concerns. What was the accessible population? Could a sample have been drawn? There were 2400 instruments collected, Fall and Spring. Were the individuals missed different from the ones who reported? Were missing cases perused?

It is also helpful when the researchers share with the reader how they addressed the underlying assumptions associated with multiple regression analysis. The restricted number of pages is always a concern when we want to know more about a study. Perhaps since the researchers indicated that results were similar for Fall and Spring, that Fall only or Spring only results and tables could be included. More space could then be allocated to more fully discussing the procedures, descriptive and relationship data.

The researchers did an excellent job with the analysis and displaying of results in regression tables. They clearly explained the variance associated with the variables. They obviously have a tremendous database of evaluation information. Now it would be interesting to research other variables that account for highly rated teaching performance. Perhaps some case studies could be conducted looking at techniques used by those who had the highest rating compared to those with the lowest. Would the results differ if this study were conducted in other colleges within the university?

The conclusions and recommendations support the findings. The researchers may not be popular for removing some of the "situational" excuses from the form, but they have challenged the faculty to look beyond these variables for others that account for good teaching evaluations. Congratulations to the researchers for undertaking a challenging study.

AN ASSESSMENT OF PERSONAL, EDUCATIONAL AND PROFESSIONAL DEVELOPMENT NEEDS AS PERCEIVED BY INTERNATIONAL GRADUATE STUDENTS ENROLLED IN THE COLLEGE OF AGRICULTURAL SCIENCES AND NATURAL RESOURCES AT OKLAHOMA STATE UNIVERSITY

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INTRODUCTION

Generally international students and especially those from developing nations have little or no information concerning educational, professional, family, or social needs upon their arrival at U.S. universities and colleges. International students often become frustrated with the circumstances in which they find themselves, yet feel they have no alternative but to accept the results of such situations. Many times, the lack of familiarity with the "systems" and stifles progress and their matriculation through an academic program. It takes time to adjust to a new environment, academic and cultural expectations as well as new personalities. In the process, there still remain family and cultural traditions which expatriates must reconcile with the new values of their adopted surroundings. Adjustment to the new environment may involve both perception and real need. As we all know, perception becomes reality in the minds of the beholders. Need may be defined as the physiological or psychological requirements for ones well being, while perception may be the mental image, concept, or awareness interpreted in the light of experience (Webster, 1976).

Addressing the needs of international students, Lee (1981) stressed that an understanding of human beings reveals various needs as well as behavioral tendencies which allow them to satisfy those needs. He indicated that physiological needs are basic, while psychological needs are those which an individual perceives by virtue of residency in a particular social environment and relationships with other human beings. While in terms of primary goals, international students attending U.S. colleges and universities would probably describe their objective as to acquire the best education possible. However, with regard to day-to-day needs, Moore (1964) expressed that many international student problems and needs were relative to English proficiency, differences in educational systems, and adjustments to American culture. However, Dunnett (1981) was more specific in elaborating on international student needs. He revealed the needs/problems most often encountered were relevant to housing, mobility, cultural differences in food and eating habits, social graces, and shopping. Moore (1964) further emphasized that financial needs, interpersonal needs, academic needs and work regulations also posed problems for international students.

Since the primary objective of international students was to acquire the best education possible Astin (1985) recommended that. . .

> Educational institutions in the U.S. should be obliged to accommodate the need for more relevant programs and practical training so students could see how to apply their U.S. education to situations in their home countries (pp.132-133).

Astin (1985) also suggested that. . .

> Allocation of the greatest proportion of resources by universities in educating graduate and professional students be given the number one priority (pp.163).

He further stressed that measures to assist students educational and professional development should be initiated. Positive classroom interaction between the students and instructor, learning communities, individually paced instruction, an updated curriculum, assistance for underprepared students, and a qualified faculty should be academic priorities for education institutions according to Astin (1985).

Patton et al. (1975) describing the needs of international students in U.S. educational institutions asked the question...

> What do foreign agriculture students want to know about agriculture in the United States (pp.85)?

In responding to the question, Patton et al. (1975) found...

> They would like to learn more about the process of information dissemination through colleges and universities, the extension service, high schools, area vocational schools and the media (pp.85).

Providing the training necessary for today's modern agriculture professional requires a great deal of planning in order to assist the individual in fitting a graduate/training program to the person's interests, educational background, skills, previous employment experiences, and culture. Altscher (1976) argued that...

> American Counselors have not been trained to provide effective support for internationals. Understanding cultural differences between the counselor and the student is prerequisite for effective counseling (pp.10).

Addressing the importance of agriculture in developing countries Miller (1985) enumerated that...

> a) Agricultural development is the for the benefit of the total consuming population, rural and urban inclusive.
> b) Economic transformation. Most under underdeveloped countries start with a major part of their population and capital in agriculture. Millers' argument is that agriculture in essence finances development of the non-agricultural sectors, it must give up part of its work force and must "go into debt" to finance non-agricultural development. Since agriculture is generally the primary earner of foreign exchange through its export crops, it provides the basis of foreign exchange to purchase non-agricultural investment and input goods (pp.29-31).

PURPOSE AND OBJECTIVES

The purpose of this study was to assess the personal, educational, and professional development needs of international graduate students in the College of Agricultural Sciences and Natural Resources at Oklahoma State University.

1. To determine the general characteristics of international graduate students enrolled in the College of Agricultural Sciences and Natural Resources during the 1991 summer semester.

2. To determine levels of influence which selected factors have relative to students' decisions to choose a graduate program at Oklahoma State University as perceived by international graduate students in the College of Agricultural Sciences and Natural Resources.

3. To determine levels of agreement associated with selected factors and previous home country job responsibilities as perceived by international graduate students in agriculture at Oklahoma State University.

4. To determine levels of need associated with selected factors pertaining to work skills which would enhance one's effectiveness in his/her area of employment in the home country as perceived by international graduate students in agriculture at Oklahoma State University.

5. To determine levels of agreement associated with selected factors and perceived need for training, skill development and/or knowledge in the specific areas of agriculture, rural development, adult and extension education and professional development by international graduate students in agriculture at Oklahoma State University.

6. To determine the level of need associated with selected factors and personal and family necessities and university/education requirements as perceived by international graduate students in agriculture at Oklahoma State University.

METHODS AND PROCEDURES

The population of this study included all (96) international graduate students enrolled in the 10 subject matter disciplines of the College of Agricultural Sciences and Natural Resources. The instrument, an investigator designed questionnaire, was deemed valid by a panel of experts from the College of Agricultural Sciences and Natural Resources at Oklahoma State University as well as a five-member panel of Agricultural Scientists from Pakistan who had received their Ph.D. degrees from five different U.S. Universities. In addition, a pilot test of the instrument was conducted utilizing international students from other colleges at Oklahoma State University.

In order to achieve a high level of participation, the questionnaires were personally delivered to the potential respondents (Summer Semester, 1991). A total of 75 (78.13 percent) international graduate students in agriculture responded to the survey. Since the questionnaires were hand delivered to the potential respondents and all had the opportunity to respond, a follow-up of the non-respondents was determined to be unnecessary.

The instrument was developed to elicit both qualitative and quantitative data. Four major areas addressed in the questionnaire were: 1) demographic data concerning the respondents; 2) selected factors influencing international students to choose graduate programs in agriculture at Oklahoma State University; 3) levels of perceived agreement and need concerning previous professional experience, skill and professional development concerning (a) future employment opportunities, (b) agriculture, (c) rural development, (d) adult and extension education; and 4) frequency of perceived need concerning personal and family needs and educational/university requirements. Frequency distributions, percentages, means, and overall ranks based on mean scores were the descriptive statistics utilized in the analysis of the quantitative data.

RESULTS AND/OR FINDINGS

Objective 1

Almost 83 percent of the international graduate student respondents were men. Twenty-six percent were Pakistanis, while the next largest contingencies were from China and Ethiopia, both with 10.67 percent. Of those working toward advanced degrees, over

41 percent were conducting graduate programs in Agricultural Economics, whereas 13.33 percent were attempting graduate work in Agronomy. Thirty-three of the 75 students (44%) were sponsored by various governmental programs/agencies, while 25 (33.3%) were involved in USAID programs and nine (12%) were on graduate research/teaching assistantships.

Objective 2

Many factors influence student decisions concerning their choice of academic institutions. In this study, the respondents indicated their decisions were primarily influenced by "academic reputation of the institution, geographic location of the institution", and the opportunity for financial assistance through "USAID sponsored graduate programs". Over 41 percent of the respondents disclosed that "Academic Reputation" ranged from a "Great Influence" to a "Very Great Influence" in their choice of an academic institution.

Objective 3

Educational opportunities/graduate programs where "academic requirements" were relevant to the job previously held in their home country" seemed to be the most important factor for further study.

Objective 4

"Procedure and Skills for Conducting Research" was the highest ranked need as perceived by the respondents. The overall mean score was 3.30 with 72 of the 75 study participants responding to this item. "Writing proposals and technical papers" was also in the "great need" category with a 3.24 mean score.

Objective 5

Food Processing was perceived as being an "agreed" upon need and ranked first as a priority in the major topic area of Agriculture.

Economic Development, Conserving the Environment, and Market Development were the top three priorities respectively in the major topic area of Rural Development.

In the major topic area of Adult and Extension Education, Planning and Appraisal of Agricultural Projects, Needs Assessment, Teaching Methods, Program Planning and Farming Systems Research were the top priorities.

Computer Operation and Applications had the highest level of agreement among the selected needs of the major topic area of Professional Development. Over 54 percent of the respondents "strongly agreed" concerning the need for professional development skills in this area. The second highest ranking priority was Presentation of Research Papers.

Objective 6

Language skill was the principle need associated with Family and Personal needs. Seventy-five out of a total of 78 respondents answered this particular question. Almost 60 percent of the respondents indicated that language skill was "Very Often a Need" for international students. Health care, positive faculty-student relationships, and positive relationships with American students were the needs most often cited after language skills and were ranked accordingly.

CONCLUSIONS AND/OR RECOMMENDATIONS

Objective 1

Undoubtedly, the international students enrolled in graduate programs in the College of Agricultural Sciences and Natural Resources are a large diverse group. However, the graduate students do seem to fit some patterns with regard to geographic origin, gender, age, academic major, previous employment experience, length of educational stay, living arrangement, participation in orientation programs, level of English proficiency, and source of funding. Therefore, it would be helpful for their major advisers to have an awareness of their identity versus the typical international student as well as their sponsoring agency.

Objective 2

International students in agriculture choosing to attend Oklahoma State University seemed to be primarily influenced by the institution's academic reputation and geographic location as well as the availability of foreign aid (USAID Funding). Therefore, kcentral administration, department heads, and faculty in the Division of Agriculture should be cognizant of these elements and their implications.

Objective 3

It was apparent that academic requirements relative to the jobs previously held at home and the need for further developing one's job skills in order to function more efficiently in the job setting were primary considerations for international graduate students in agriculture. Therefore, in order to assist international students in performing more efficiently in the job setting, academic advisers need to be aware of the student's background and previous experiences. The adviser's awareness of the student's circumstances should help in matching the students study plan to educational qualifications and career goals.

Objective 4

The respondents appear to be extremely cognizant of the need to develop skills that will assist them to work more efficiently in their former positions. Therefore, with the emphasis in their home countries being in the area of research, program planning and academia, it should be no surprise that procedure and skills for conducting research, writing proposals and technical papers, project planning and appraisal, and evaluation of educational programs were perceived to be the areas with the greatest professional need and priority. Therefore, academic advisers should be aware of the emphasis that is placed on conducting research, writing proposals for funding and technical papers, project planning, and program/project evaluation by governments and institutions in developing nations.

Objective 5

With regard to needs associated with training, skill development, and education, it was apparent from the major topic areas of Agriculture, Rural Development, Adult and Extension Education, and Professional Development that the development of skills in these areas would enhance one's opportunities for vertical advancement in their previous area of employment and/or allow one to make a horizontal move to positions in other fields of endeavor. Therefore, Agriculture, Rural Development, Agricultural and Extension Education, and Professional Development should be reflected in international student's study plans regardless of major.

Objective 6

It was evident that the greatest concern among family and personal needs was the ability to communicate. However, perceived need for language skills seems to be as much a family need as it does for the graduate student to be able to interact with faculty and peers. Another concern among the respondents was faculty advisement, the grading system, academic expectations, and library service. It is clear new evaluation systems, strangers, different expectations coupled with language differences, and the American culture create uncertainty and the need for friends and absolutes in the lives of internationals. Therefore, an awareness on the part of academic advisers should warrant positive action to address these situations at the most opportune time.

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AN ASSESSMENT OF PERSONAL, EDUCATIONAL AND PROFESSIONAL DEVELOPMENT NEEDS AS PERCEIVED BY INTERNATIONAL GRADUATE STUDENTS ENROLLED IN THE COLLEGE OF AGRICULTURAL SCIENCES AND NATURAL RESOURCES AT OKLAHOMA STATE UNIVERSITY

A Critique

Carey L. Ford, Tennessee State University - - Discussant

I enjoyed reading this manuscript and commend the authors for providing a concise informative study that focused on the needs of international students. In many situations international students face a tremendous challenge in becoming oriented to our higher education system and society. The introduction clearly set the stage for the study.

The authors provided an excellent review of literature establishing the need for the study and building on the research that has been conducted. The objectives were clearly stated. Research procedures were sound, which included sampling the total population. Three groups reviewed the instrument for content validity. A survey instrument was designed and used for data collection.

The results were presented in a scientific manner with the authors communicating key results. The researchers pointed out that the ability to communicate is one of the greatest concerns among family and personal needs. Conclusions and recommendations were consistent with the results reported. Again, I commend the researchers for addressing a critical problem in a very professional manner.

In reviewing the paper, the following questions or comments were proposed to the investigators for discussion:

1. What was the rationale of selecting a summer semester for data collection ?
2. What type measure scale(s) was used?
3. Was there a difference between the results of the first year and second year students regarding professional development?
4. A recommendation is being made that the study should be replicated across the country.

AN ASSESSMENT OF THE READABILITY LEVEL OF STATE ADOPTED HIGH SCHOOL AGRICULTURE TEXTBOOKS

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AN ASSESSMENT OF THE READABILITY LEVEL OF STATE ADOPTED HIGH SCHOOL AGRICULTURE TEXTBOOKS

INTRODUCTION

There has been a lot of research conducted in attempts to determine if students in today's high schools are reading at an appropriate level for their age. Roe, Stoodt, and Burns (1987) and French (1986) voiced concerns about secondary students' reading achievements. The number of states which have established minimum graduation requirements for high schools demonstrates a general dissatisfaction with reading achievement.

According to Flesch (1981), 21.7 percent of the adult Americans in 1975 between 18 and 65 years of age could not read something as simple as a want ad or a safety sign on the job. Of those 21.7 percent, or 23 million people, 16 percent had not gone above the third grade. This meant 19 million people had gotten at least four years of education, but had still not learned to read.

LaBonty (1991) stated there were 27 million functionally illiterate Americans. Thirty-five million had lower than minimum survival skills. These two groups total one-third of the adult population. LaBonty also listed the United States' rank among 159 United Nations members as 49th in literacy and 24th in book production.

The textbook is the most often used instructional material at the high school level. Many times it is the only instructional material used. Because of the length of time required to produce textbooks, however, many of them are used long past their usefulness (Ornstein, 1989). Why would a teacher use a book if this statement is true? The main reasons are the textbook can be reference material, and supply reorganization and an outline to the teaching plan.

Many researchers believe textbooks can have a positive impact on student learning. Pratt (1972, p. 4) stated textbooks are "significant sources of information on a variety of subjects..." If a textbook is written in an in-depth, selective fashion, it encourages reading. One student explained the reason he liked a particular course was because the textbook was more like a real book one could find in a library (Newmann, 1988). Heyneman, Farrell, and Sepulveda-Stuardo (cited in Westbury, 1990) noted that 15 of 18 studies showed positive relationships between the use of textbooks and achievement.

Research by Newman and Warmbrod (1986) indicated agricultural education students maintained grade point averages on a par or slightly above the general student body. The data, obtained for the years 1982 to 1985, showed agricultural education students were able to achieve equally with their peers who were not in agricultural education. This data supports the assumption that agricultural education students read at the same level as the average high school student. Therefore, research conducted with average students should be applicable or able to be generalized to agricultural education students.

One way to determine if textbooks are at an appropriate reading level for the intended students is to apply a readability formula to the text. The validity and reliability of formulas have been questioned many times, however. Schneider (1991) states the Gunning-Mueller Fog Index has three factors that are important in formula selection: suitability, validity, and reliability. He states the formula is easy to apply. Also, it is based on the two strongest variables for language, which are word difficulty and sentence length (Klare, cited in Schneider, 1991). According to Gunning (cited in Schneider, 1991), the formula has been found to be reliable and valid.

Readability formulas, such as the Fog Index, are not infallible or conclusive in determining the readability level of a piece of material. They can play meaningful roles when they are used in conjunction with other tools and criteria (Thomas, Stahl, & Swanson, 1984). Formulas were created to predict reading difficulty, not to explain what makes a text readable (Trollinger and Kaestle, 1986).

PURPOSE AND OBJECTIVES

Because of the inability of textbooks to keep up with scientific progress, publishers try to develop one textbook at a time to last for several years for a given subject. Teachers want to be confident their students will be able to read a book the school will have to use for at least a few years.

Textbooks that have to be kept for five or six years need to be at the reading level of the students expected to use them to get the best service out of them. The purpose of this study was to determine, through the use of a readability formula, whether the textbooks being used in high school agricultural classrooms are at a suitable level for the students intended to use them.

The specific objectives of this research were to determine:

1. The overall readability of high school agricultural education textbooks listed on state-approved textbook lists; and

2. the readability of high school agricultural education textbooks by state of use.

PROCEDURES

The Gunning Mueller Fog Index (1981) was used to determine the reading level of textbooks used in high school agricultural education classes.

For this study, a list of 82 agriculture textbooks was obtained from the 14 states which had an approved textbook list for the 1991-1992 school year. Ten textbooks were unobtainable from either local sources or the publishers themselves.

The data was collected by hand from 72 of the 82 textbooks originally found on the state approved textbook lists. Three samples were taken from each textbook, which were then incorporated into a computer program developed for the purpose. The data was then analyzed using the SAS statistical program to obtain the final results.

In two separate checks, the Fog Index was found to be fairly reliable in determining readability levels. A group of 16 of the textbooks in this study were randomly selected and scored twice using the Fog Index. This is a total of 22.2 percent of the population of 72 textbooks included in the study. The average difference between the first set of samples and the second was less than one and one half grade levels. A second group of ten books from Delmar Publishers (for 13.9 percent of the population) was compared with the results obtained by Delmar, who used a computer program to evaluate the books. The computer program uses ten different indices, including: the Automated Readability Index, Coleman-Liau Formula, Farr-Jenkins-Paterson Formula, Flesch Reading Ease Formula, Flesch-Kincaid Formula, Fry Graph, Gunning Fog Index, SMOG Index, PROSE Index, and the Dale-Chall Formula. The ten indices were averaged and compared with the score obtained in this research. The mean difference between the two groups of results was 1.03 grade levels. These two tests indicate the Fog Index to be fairly accurate and valid for this study.

RESULTS

The results were grouped as individual observations and by state use. The mean readability of the 72 textbooks included in the data analysis was a grade level of 12.16. The books ranged from 8.33 to 15.53 grade levels for all textbooks. The median grade level was 11.95.

The distribution of the books places 48.6% of the books at the twelfth grade readability level or higher. One-third of the books are at the readability grade level of 13, 14, or 15. Only 29.2 percent are rated at the eighth, ninth, or tenth level (Figure 1).

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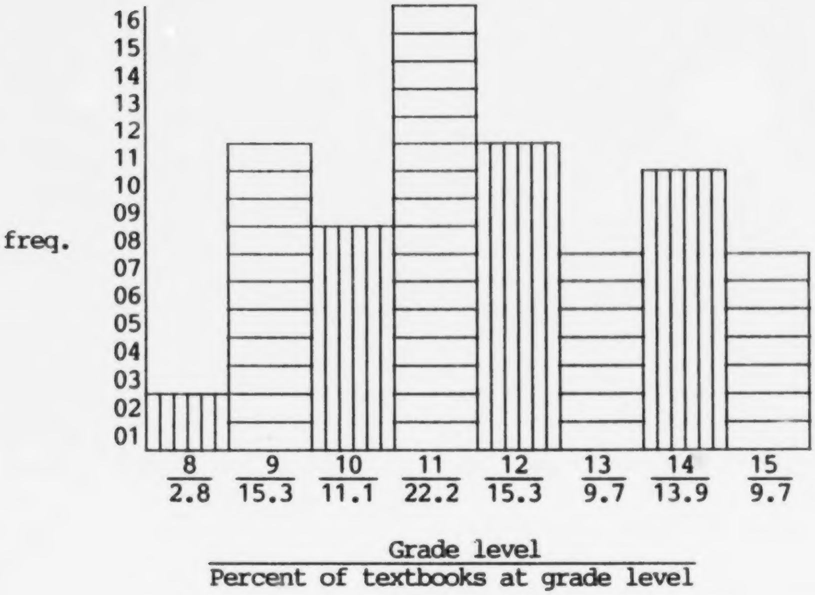

Figure 1. Frequency Distribution of Textbooks According to Readability Grade Levels

freq. = frequency

Table 1 shows the data for the analysis of the books by state. Georgia had the highest average readability of the fourteen states, leading four other states with averages at the college freshman level. Florida, with only four books on its list, had the lowest average at about the high school sophomore level.

All but two of the states included the Introductory Horticulture with the lowest readability grade level of 8.33. Six states included SOE Programs in Agriculture with the highest level of 15.53.

TABLE 1

GRADE LEVEL READABILITY OF AGRICULTURE TEXTBOOKS BY STATE

State	Books N	Min.	Max.	Mean	SD
Alabama	31	8.33	15.33	12.29	2.08
Arkansas	50	8.33	15.53	12.22	2.10
Florida	4	8.33	11.68	9.71	2.06
Georgia	40	8.33	15.53	12.60	2.43
Idaho	12	8.33	14.32	10.98	2.21
Kentucky	38	8.33	15.53	12.20	2.01
Louisiana	22	8.33	15.22	11.99	1.89
Mississippi	22	8.33	14.97	11.64	2.08
Nevada	2	8.33	14.97	11.65	4.70
North Carolina	17	8.33	15.53	12.16	2.56
Oklahoma	12	8.67	14.32	11.01	2.18
South Carolina	9	9.07	15.22	9.92	2.37
Tennessee	20	8.33	15.53	11.76	2.19
Texas	19	8.33	15.22	11.90	2.07

The four states with the highest mean readability grade levels (Georgia, Alabama, Arkansas, and Kentucky), also had the largest numbers of books. The four states all included the book with the 15.53 rating.

The five states with the fewest number of books (Nevada, Florida, South Carolina, Idaho, and Oklahoma), had the lowest mean readability. Figure 2 shows a frequency distribution according to state readability grade levels.

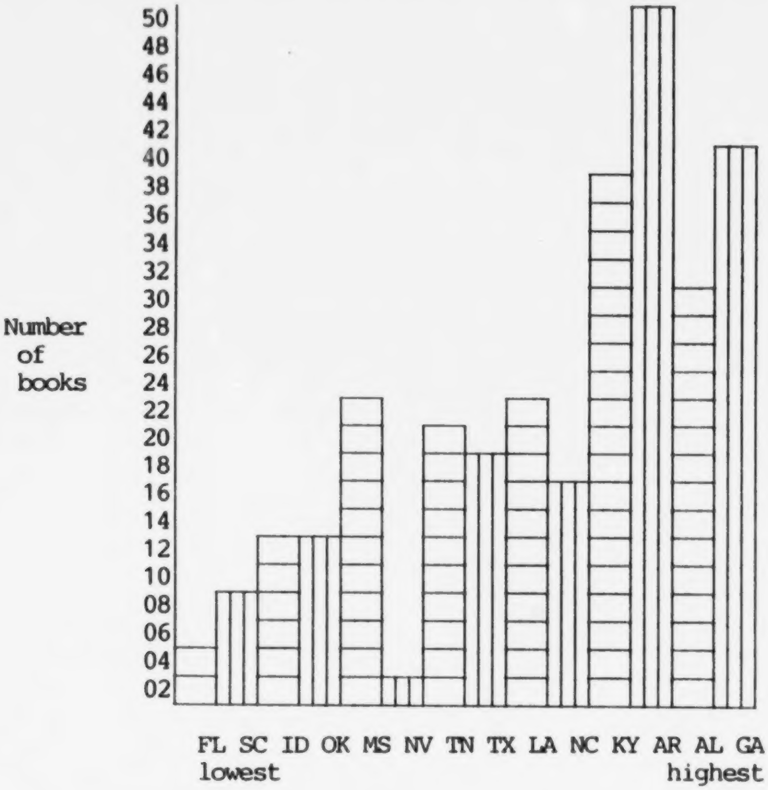

Figure 2: Number of Textbooks and Readability Grade Level by State

CONCLUSIONS AND RECOMMENDATIONS

Textbook publishers are selling books that are often at too high a readability grade level for the students who eventually use them. With a mean and a median readability grade level at about the high school senior level, this means nearly half of the books are above the reading grade level of agricultural education students.

Several of the books on the approved textbook lists are used in college classrooms. One textbook is known to be used in classes in at least three universities (The Meat We Eat), and others, such as The Stockman's Handbook, are used for collegiate level courses or as a reference book.

Discussion with supervisors from several states (Mississippi, Arkansas, and North Carolina) indicated that states often include higher level books on their approved textbook lists as reference texts. In some states, teachers are not allowed to order a book unless it is on the list. To enable teachers to order a reference text for their own use, the books are included as a part of the official list. The main problem with this is the lists do not indicate which texts are to be used in the classroom, and which would be better used as a reference text.

Of the 14 states with textbooks included in the study, the ones with the fewest books on their lists have the lowest mean readability levels. This could indicate those states make an effort to chose books with a readability level that is more appropriate for high school students and that reference books are not a part of their approved lists.

Based on this research the following recommendations are suggested:

1. Further study should be conducted to determine whether teacher reference texts are included on approved lists, and if so, which books are considered teacher reference texts by each state in the study.

2. Further study should be conducted to determine whether teachers know which texts are meant to be used only for teacher reference, and which ones are not.

3. Many teachers do not know how to determine textbook readability. Instruction in readability determination methods should be provided for teachers in preservice and inservice education.

4. Teachers use textbooks in many ways in the classroom. The teacher's opinion of a textbook may affect how that book is used. Further study should be conducted to determine the teachers' opinions of the textbooks included in this study, and to determine if teacher opinion agrees with the readability levels of these books.

5. Research should be conducted to determine what written materials besides textbooks Agriculture teachers use and what methods they use to select them.

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AN ASSESSMENT OF THE READABILITY LEVEL OF STATE ADOPTED HIGH SCHOOL AGRICULTURE TEXTBOOKS

A Critique

Christine D. Townsend, Texas A&M University--Discussant

Hitchner and Deeds have conducted an important study in assessing the quality of secondary agricultural education programs. The introduction of the paper presented an excellent justification for the study. The researchers related the high number of Americans who cannot read or who are functionally illiterate. The underlying concern, of the study was to determine the readability of agricultural education textbooks in a society filled with persons with low reading skills.

The methodology used for this study was an appropriate design for this initial study on readability. The researchers used an existing readability formula to check agricultural education textbooks. The researchers were quick to point out that this index, as others, was not "infallible." They collected the lists of state-adopted texts and randomly selected a group to include in the treatment.

Several questions were unanswered in the report which could have strengthened the study. It was a concern that the results from the Fog Index scoring were stated as "fairly reliable." No reliability scores were indicated in the paper. What were the reliability scores for this study in comparison to general or historical Fog Index reliabilities?

Another question developed after reviewing the paper concerned the Delmar Publisher sample of books. After completing the Fog Index, the researcher compared the results with Delmar's computer readability analysis. Somehow these two treatments were compared and the researchers concluded that because the mean differences were slight, the Fog Index was "fairly accurate." Can we be confident with this statement? Were the readability levels compared statistically? Were the Fog Index and the Delmar computer analysis statistically similar? The researchers should be cautious as they presented no statistical data to substantiate their statements.

The researchers have completed a study that could stimulate further investigation. First, although they reported in the introduction that agricultural education students were academically similar to all students, what was the actual readability of agricultural education students? Were the readability levels found by the researchers accurate for our students? We may not be able to assume that students in grade 11 read at grade 11 readability. Is there a possibility that we should use texts of higher levels to stimulate a higher level of reading by our students? Generally, educators believe that students who read more will excel academically. Is there further research needed to determine if students in agricultural education classes learn more agriculture when they read their agriculture texts?

The recommendations from this research suggested some interesting action by states, publishers, and teachers. Teacher preparation programs may enhance the effectiveness of agricultural education teachers by providing them instruction in assessing textbook readability. The researchers may have suggested a broadening of our agricultural education agenda to include general literacy concerns such as reading skills into our programs.

ATTITUDES AND PERCEPTIONS OF SUPERINTENDENTS, PRINCIPALS, GUIDANCE COUNSELORS, AND AGRICULTURE TEACHERS TOWARD AGRICULTURAL EDUCATION REFORM IN KENTUCKY

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INTRODUCTION AND THEORETICAL FRAMEWORK

Many changes have occurred in public education since the National Commission of Excellence in Education published A Nation at Risk in 1983. Numerous vocational education programs have come under close scrutiny and reduced enrollment as a result of school reform efforts. In the 1980's vocational agriculture enrollment decreased significantly. In the five year period of 1983-87 vocational agriculture enrollments dropped an average of 10.88% in the United States. In the 13 states of the Southern Region of the United States vocational agriculture enrollments dropped an average of 4.65% (Frantz, 1988). The National Research Council's study of vocational agriculture reported that agricultural education has lagged behind the school reform movement and that changes in vocational agriculture must occur to maintain the programs (National Research Council, 1988). This study concluded that the relevance and scope of the agriculture curriculum, supervised agriculture experience, and FFA must be broadened.

Simultaneously, the Kentucky State Staff of Agriculture Education began to look at revising the state vocational agriculture program. The Goals for Agribusiness in Kentucky (1987) listed "Update Courses and Course Titles" as one of the primary goals. From its inception in 1987 to its adoption in 1990, the Kentucky program has evolved into a program which allows each local system to plan a program of courses which most nearly meets the needs of students in the community. This was accomplished by revising the program's name to "Agriculture Science and Technology Education" and by offering a total of 29 possible semester or year long courses to provide flexibility (Brannon, 1991). Following the national effort to revise Agriculture Education, Kentucky developed a Tactical Plan calling for 8 goals to improve Agriculture Education in Kentucky. This was developed in response to the Strategic Plan for Agriculture Education and the Kentucky Education Reform Act (KERA) which was passed in 1990.

Previous researchers (Magill, 1990; Matulis 1990; Johnson, 1992) have provided information concerning the fact that school administrators and guidance counselors are influential decision makers in the success of agricultural education programs. Other research (Carpenter-Hoffman, 1974; Connelly and Clandinin, 1988) has indicated that understanding perceptions of influential decision makers is essential for successful implementation of innovative educational programs. To measure these perceptions, this study was planned and conducted.

PURPOSE AND OBJECTIVES

The purpose of this study was to access the attitudes and perceptions of Superintendents, Principals, Guidance Counselors, and Agriculture Teachers toward agriculture education reform in Kentucky.

In order to better comprehend and accomplish the purpose of this study, the following objectives were formulated:

1. To determine demographics of those surveyed with regard

to occupation, years employed in present position, and whether or not they had been enrolled in Agriculture Education in high school.

2. To determine and compare the perceptions of Superintendents, Principals, Guidance Counselors, and Agriculture Instructors regarding Education In and About Agriculture, Kentucky Agriculture Education Reform, and the impact of Agriculture Education on the desirable student outcomes defined in the 1990 Kentucky Education Reform Act (KERA).
3. To compare the perceived perception of respondents surveyed with regard to whether or not they had been enrolled in high school agriculture.

METHODS AND PROCEDURES

The instrument used to collect the data was developed from similar studies of vocational agriculture.(Brannon, 1991; Magill, 1990; Burnett and Miller, 1983; McGhee, 1975) The instrument gathered demographic data and ask for perceptions of the local program on 35 statements dealing with Education In and About Agriculture, Kentucky Agriculture Education Reform, the goals of the Kentucky Agriculture Education Strategic Plan, and impact on student outcomes as defined by KERA. Data on the 35 statements was gathered using a five-point Likert-type scale.

After the instrument was formulated, additions, deletions and corrections were solicited from the Agriculture Education faculty at Murray State University and Oklahoma State University, and the Kentucky State Department of Education. The reliability analysis of the instrument yielded the result of Alpha = 0.8658.

A cover letter and a copy of the survey was sent to each Superintendent, Principal, Guidance Counselor, and Agriculture Teacher in Kentucky whose school offered an Agriculture Education program. Initial response and a follow-up survey yielded an overall response rate of 62%. A random telephone follow-up of 10% of the non-respondents was conducted. Statistical tests to compare means revealed no significant differences from the previous groups who responded.

Data analysis included frequencies, means and group means. A one-way analysis of variance was utilized to compare mean differences among groups and a Scheffe procedure multiple range test was conducted to determine significant group differences. A t-test for each statement was used to compare the mean differences between respondents who had been enrolled in agriculture education and those who had not. The alpha level was set at $p <.05$.

RESULTS AND/OR FINDINGS

Tables I, II, and III show a breakdown of respondents according to the demographics in objective 1. Table I shows that 401 of the 650 (62%) surveyed responded. Agriculture teachers had the highest number and percentage of returns; however, all groups had above 50% return. Table II reveals that the highest percentage of Agriculture Teachers (75.3%), Guidance Counselors (56.0) and Principals (36.5%) had been employed in their present position for more than 8 years. Superintendents highest percentage(29.4%) was found in the 0-2 year range and over 60% had been employed less than 6 years.

Overall, 187 (48%) of the respondents had been enrolled in agriculture education in high school. The survey revealed that 83.6% of Agriculture Teachers had been enrolled in Agriculture Education; whereas 39% of Superintendents, 28% of the Principals and 8% of the Guidance Counselors had been enrolled.

Questions 1-17 dealt with Education In and About Agriculture. The highest overall mean ratings of agreement was found with questions six, "The FFA plays an important role in the development of leadership skills"(4.67), five, "FFA activities are an integral part of the agriculture education program"(4.60), three, "All high school students should have training in leadership development"(4.40), ten, "Administrative encouragement and support is crucial to the success of the local program of agriculture education"(4.40), four, "Our local agriculture education program is important to our overall educational system"(4.36). and twelve, "Ag Education training is beneficial regardless of occupation"(4.01). Question eight, "Vocational Agriculture Education classes are adequately funded by the state add-on appropriation"(2.81) rated the lowest overall mean.

In looking at the specific group ratings, a one way analysis of variance revealed significant differences between groups on each statement except number 17, "Supervised Agriculture Experience (SAE) is necessary for students enrolled in Vocational Agriculture Education". These significant differences are noted in Table IV. In addition to the aforementioned questions, Agriculture Teachers rated the following questions significantly higher than the other three groups;

7. "Class scheduling is a problem for those students wanting to take an agriculture education course"
13."Agriculture Science and Technology classes should count as science electives,"
2. "All high school students should have experience in agriculture"
1. "All students should have basic knowledge of agriculture"
9. "Local funding for agriculture education is adequate"
11."All students (K-12) should receive instruction in agriculture"
14."Ag Education has traditionally had a large number of academically deficient students"

Particularly interesting was a significant difference between Guidance Counselors and ag teachers perception on question 7, "Class scheduling is a problem" and question 16, "Students who are interested are encouraged to take an agriculture course".

The next group of questions (18-29) pertained to the perceptions of the four groups regarding Kentucky Agriculture Education Reform and achievement of the goals of the strategic plan. The highest overall mean ratings of agreement were found with question 19, "Instruction in agriculture has been updated"(4.07), and question 20, "Programs teaching about agriculture have been updated" (3.98). In looking at the specific group ratings, a one way analysis of variance showed a significant difference between groups in 7 of the 12 statements. These differences are noted in Table IV. Agriculture teachers disagreed and significantly differed with the other groups on questions; 24, "FFA participation has increased", and 26, "Supervised Agriculture Experience (SAE) programs have greater participation". The majority of the means in this section were in the Neutral (3) to Agree (4) range.

The last group of questions (30-35) pertained to the perceptions regarding the impact of agriculture education on the desirable student outcomes as defined in the 1990 Kentucky Education Reform Act (KERA). These perceptions are shown in Table IV. The highest overall mean ratings of impact are found in the following desirable student outcomes; statement 33, "Becoming responsible members of a family, work group, or community including demonstrating effectiveness in community service"(4.01), and statement 32,"Becoming a self-sufficient individual"(4.00). Agriculture Instructors had significantly higher ratings on all six statements.

A t-test was performed to compare differences between the mean attitudes of all respondents based on whether or not they had enrolled in agriculture education in high school (see Table V). The 2 tailed probability t -test resulted in 24 statements being significantly different at the .05 alpha level. There was a significant difference among groups on each of the questions of Education in and about agriculture except number 17. Also, those enrolled in agriculture perceived the impact of agriculture education on 5 of the six goals of KERA to be significantly higher.

CONCLUSIONS

There has been a high turnover rate of superintendents since the onset of KERA as documented by the number employed less than 6 years.

The respondents agreed that all high school students should have training in leadership development, that Agricultural Education programs are beneficial regardless of occupation, that continued administrative encouragement and support is crucial to the success of the local agriculture education program, and that Supervised Agriculture Experience (SAE) programs are necessary for students enrolled in Agriculture Education. They strongly agreed that the FFA plays an important role in the development of leadership skills. Agriculture Instructors and Superintendents felt that Vocational Agriculture Education classes are not adequately funded by state appropriations.

Those surveyed agreed that instruction in agriculture and programs teaching about agriculture have been updated due to the Kentucky Agriculture Education Reform. Agriculture teachers agreed that enrollments have increased but tended to disagree that participation in FFA and Supervised Agricultural Experience (SAE) programs have increased due to the Kentucky Agriculture Education Reform.

Respondents believed that vocational agriculture will have much influence on statements 32, 33, & 34 (goals 3,4,& 5) and some to much influence on statements 30, 31,and 35 (goals 1,2, & 6) of the six desirable student outcomes listed in the 1990 Kentucky Education Reform Act (KERA).

Respondents who were enrolled in agriculture education in high school tended to have a more positive attitude toward agriculture education programs in Kentucky and generally had a significantly higher rating of impact of agricultural education on the student goals of KERA.

RECOMMENDATIONS

1. Local school systems should continue to publicize the fact that all students need leadership development training and that the FFA plays an important role in this development.
2. Every effort should be made to continue to emphasize FFA and SAE program participation in the state agriculture education program delivery system.
3. The State Department of Education should continue to explore the possibility of counting Agriculture Science and Technology classes as science electives.
4. Students who are interested should be encouraged to take an agriculture course by their counselor or person responsible for scheduling and the agriculture instructors should work closely with those involved to insure such.
5. More funding is needed by both the local school system and the state if agriculture courses are to be updated to comply with the state reforms and new technological updates in agriculture.
6. Agriculture Education should continue to revise and update its programs teaching In and About agriculture.
7. The benefits of the Agriculture Education program in developing the student outcomes of KERA should be publicized statewide and in each local school district.

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Table I

Response Rate by Group

Group Response	Sample Size	Number of Respondents	Percent
Principal	144	75	52.1
Superintendent	120	69	57.5
Guid. Counselor	144	92	63.9
Ag Teacher	242	165	68.2
Total	650	401	61.7

Table II

Demographics of Respondents by Years Employed

	0-2 yrs		3-4 yrs		5-6 yrs		7-8 yrs		over 8		Total	
Occupation	#	%	#	%	#	%	#	%	#	%	#	%
Principal	16	21.6	15	20.3	7	9.5	9	12.2	27	36.5	75	100
Superintendent	20	29.4	12	17.6	10	14.7	9	13.2	17	25.0	69	100
G. Counselor	5	5.5	13	14.3	13	14.3	9	9.9	51	56.0	92	100
Ag Teacher	18	11.1	9	5.6	9	5.6	4	2.4	122	75.3	165	100

Table III

Demographics of Respondents Enrolled in Agriculture Education in High School

Enrolled	Principal		Superintendent		G.Counselor		Ag. Teacher	
	#	%	#	%	#	%	#	%
Yes	21	28.4	26	38.8	7	7.9	133	83.6
No	53	71.6	41	61.2	82	92.1	26	16.4
Omit	1		2		3		6	
Total	75	100.0	69	100.0	92	100.0	165	100.0

Table IV
Mean Ratings

Question #	Principal	Superintendent	Guidance Counselor	Agriculture Teacher	Total	Sign. Diff.*
Perceptions of Education In & About Agriculture						
1	3.53	3.55	3.56	4.55	3.96	CEF
2	2.75	2.68	2.75	3.61	3.09	CEF
3	4.25	4.23	4.06	4.73	4.40	CEF
4	4.17	4.21	4.14	4.64	4.36	CEF
5	4.49	4.47	4.44	4.78	4.60	CEF
6	4.57	4.55	4.51	4.85	4.67	CEF
7	2.57	2.71	2.17	3.96	3.07	DCEF
8	3.20	2.59	3.38	2.42	2.81	ACDF
9	3.37	3.57	3.48	2.50	3.07	CEF
10	4.16	4.26	4.30	4.62	4.40	CEF
11	3.28	3.40	3.29	4.41	3.77	CEF
12	3.76	3.62	3.65	4.47	4.01	CEF
13	2.90	3.15	2.86	4.58	3.63	CEF
14	3.28	3.00	3.32	4.16	3.60	CEF
15	3.42	3.40	3.53	4.25	3.78	CEF
16	3.94	3.88	4.30	3.01	3.63	CEF
17	3.53	3.53	3.55	3.58	3.55	
Perceptions of Kentucky Agriculture Education Reform						
18	3.00	2.97	3.11	3.59	3.26	CEF
19	3.98	3.73	3.98	4.29	4.07	CEF
20	3.98	3.72	3.96	4.11	3.98	E
21	3.37	3.42	3.62	3.93	3.67	CE
22	3.63	3.53	3.92	3.84	3.77	D
23	3.84	3.75	3.78	3.75	3.77	
24	3.17	3.18	3.25	2.88	3.07	F
25	3.45	3.68	3.52	3.56	3.55	
26	3.01	3.05	3.10	2.37	2.77	CEF
27	3.18	3.42	3.45	3.34	3.35	
28	3.06	3.05	3.22	3.16	3.14	
29	3.46	3.38	3.43	3.64	3.52	
Perceptions of Vocational Agriculture's impact on KERA						
30	3.28	3.46	3.35	4.22	3.72	CEF
31	3.26	3.43	3.36	4.12	3.67	CEF
32	3.81	3.85	3.75	4.27	4.00	CEF
33	3.84	3.81	3.81	4.29	4.01	CEF
34	3.73	3.56	3.55	4.34	3.91	CEF
35	3.42	3.44	3.37	4.12	3.70	CEF

Note: * $p < .05$ Scale: 1-Strongly Disagree, 2-Disagree, 3-Neutral, 4-Agree, 5-Strongly Agree

A - Principals differ from Superintendents
B - Principals differ from G. Counselors
C - Principals differ from Ag. Teachers
D - Superintendents differ from G. Counselors
E - Superintendents differ from Ag. Teachers
F - Guidance Counselors differ from Ag. Teachers

Table V

Perceptions by Enrollment in High School Agriculture

Mean Ratings

Question #	Enrolled in Ag. Ed.	Not Enrolled in Ag. Ed.	Total	T - Test Signif.*
1	4.30	3.64	3.96	*
2	3.39	2.80	3.08	*
3	4.61	4.21	4.40	*
4	4.53	4.19	4.36	*
5	4.74	4.46	4.59	*
6	4.80	4.54	4.66	*
7	3.62	2.55	3.06	*
8	2.55	3.07	2.82	*
9	2.78	3.36	3.08	*
10	4.51	4.29	4.40	*
11	4.17	3.40	3.77	*
12	4.27	3.76	4.01	*
13	4.07	3.21	3.62	*
14	3.81	3.42	3.61	*
15	4.02	3.57	3.79	*
16	3.34	3.90	3.63	*
17	3.59	3.52	3.55	
18	3.44	3.13	3.28	*
19	4.13	4.00	4.06	
20	4.02	3.95	3.98	
21	3.82	3.53	3.67	*
22	3.78	3.77	3.77	
23	3.77	3.79	3.78	
24	3.00	3.12	3.06	
25	3.62	3.51	3.56	
26	2.58	2.94	2.77	*
27	3.32	3.39	3.35	
28	3.15	3.14	3.15	
29	3.51	3.53	3.52	

Note: * p <.05 Scale: 1-Strongly Disagree, 2-Disagree 3-Neutral, 4-Agree, 5-Strongly Agree

30	4.00	3.46	3.72	
31	3.94	3.42	3.67	*
32	4.12	3.88	4.00	*
33	4.16	3.88	4.02	*
34	4.16	3.70	3.92	*
35	3.95	3.48	3.71	*

Note: * p <.05 Scale: 1-None, 2-Little, 3-Some, 4-Much, 5-Great

ATTITUDES AND PERCEPTIONS OF SUPERINTENDENTS, PRINCIPALS, GUIDANCE COUNSELORS, AND AGRICULTURE TEACHERS TOWARD AGRICULTURAL EDUCATION REFORM IN KENTUCKY

A Critique

Robert Terry, Jr., Texas Tech University -- Discussant

In a time when change is the norm, it is important to step back and assess the effects of change. Programs of agricultural education in secondary schools in many states have changed their curriculum in recent years (either voluntary or mandatory). This study investigated the perceptions that various concerned groups have about changes made in the secondary agricultural education program in Kentucky.

The introduction and theoretical framework described the background leading to the research problem. The need for curricular reform and the plan enacted by the leaders of agricultural education in Kentucky were established. The purpose was clear and concise and the objectives were researchable. Objective three could have been expanded to include other demographic characteristics in addition to "whether or not they had been enrolled in high school agriculture." Other factors might have included whether or not they were ever 4-H members or grew up on a farm, or the size of their hometown.

The methodology was describe in appropriate detail. The development of the instrument as well as validity and reliability were addressed. The alpha of .8658 was certainly adequate. The statistical procedures used were appropriate for the data analysis.

The response rate (62%) would have been a problem if not for the follow-up procedures which included comparing the respondents to 10% of the non-respondents who were surveyed via telephone. One question to this procedure is: were non-respondents compared to respondents of each group surveyed (i.e. superintendents, counselors, teachers)?

In the results section, the description of the data collected related to objective 1 was well written and understandable. The tables related to this objective (1,2, and 3) contributed to the information presented. The results related to objective 2 were also clearly presented in the narrative form. Due to the limited space of the paper, numbers were used for each statement in tables 4 and 5. This "abbreviation" made those tables less useful.

In reporting the results of the one-way analysis, the author stated that teachers rated question #9 significantly higher than the other groups. In fact, the teachers rated that question lower.

Significant differences were found in the responses of many questions when the sample was divided based upon whether the respondents took vocational agriculture classes in high school. Again, analysis should have been conducted to determine if other demographic characteristics have an effect upon perception of the groups.

The conclusions are well founded in the results of the study. Conclusions could have been made concerning the perception of each of the four groups surveyed. Some of the recommendations do not seem to be based upon the results and conclusions of the study (see recommendation 3). Perhaps there should be a recommendation concerning providing information to counselors about the benefits of agriscience courses.

ATTRITION IN NORTH CAROLINA SECONDARY SCHOOL VOCATIONAL AGRICULTURE COURSES AS A FUNCTION OF COMMUNITY CHARACTERISTICS

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THE PROBLEM AND THE OBJECTIVE

The present study was developed from analyses of enrollment data of students in vocational agriculture courses in North Carolina secondary schools from 1985 to 1990. Two main points were evident: First, total enrollment in vocational agriculture programs declined from a reported enrollment of 26,793 in Fiscal Year 1985, to a reported enrollment of 23,863 in Fiscal Year 1989.

Second, attrition of students enrolled in secondary school vocational agriculture courses has exceeded the attrition of the total enrollment of North Carolina secondary school students from 1984-1985 to 1988-1989.

The enrollment data were taken from "Professional Personnel Activity Reports", compiled by the Information Center Staff of the Division of communication services, North Carolina Department of Public Instruction.

The principal objective of the study was to design a regression model to determine (1) whether the model was effective in explaining variability in four selected dependent variables in a selected population of secondary schools, and (2) which of 16 potential explanatory (i.e., independent) variables included in the model yielded high ratios between their partial regression coefficients and their repsective standard errors in the selected population of secondary schools. The objective, stated in question form, was: Are attrition and enrollment in vocational agriculture courses in secondary schools functions of characteristics of the larger economic and political community?

METHODOLOGY

The study population selected was the 34 counties in Education Districts III, IV, and V, located in the Piedmont region of North Carolina. Vocational agriculture courses were offered in 96 secondary schools in the 34 selected counties in 1988-1989, the academic year for which data were obtained. The study dealt solely with the population defined; the 34 counties were not treated as a sample of the total population of 100 North Carolina counties.

For this study four dependent variables were defined. Dependent variable Y_1, Ratio of Level II enrollment to Level I enrollment, and Dependent Variable Y_2, Ratio of Level III enrollment to Level I enrollment, pertained to attrition. Dependent variable Y_3, proportion of Grade 10-12 students enrolled in Levels I-III vocational agriculture courses, and Dependent Variable Y_4, Proportion of Grade 12 students enrolled in Level III vocational agriculture courses, pertained to enrollment. For identifying independent, or explanatory, variables, two major references were used. One reference was a report on vocational agriculture in secondary schools in the nation, issued by the Committee on Agricultural Education in Secondary Schools (1988). The second was a monograph authored by Singelmann (1978), which utilized data previously reported by Fuchs (1968).

The committee report dealt with the contemporary status of agricultural education in the nation, and identified and analyzed trends and conditions which were thought to explain changes in status, especially enrollment. The analyses were used in developing a list of potiential explanatory variables, based on a tacit assumption of high positive correlation between attrition and enrollment, as defined herein.

Using the report of the Committee and the Singelmann-Fuchs studies as guides, a list of 16 potential explanatory variables, hypothesized as candidates for explaining variability in the dependent variables, was compiled. The 16 variables were:

List of Independent Variables

X_1	Proportion of employed population in agriculture.
X_2	Per cent of farm operators whose principal occupation is farming.
X_3	Proportion of employed population in agricultural related occupations.
X_4	Per cent of total earnings from farming.
X_5	Value of agricultural products sold.
X_6	Farm personal income.
X_7	Proportion of population that is rural.
X_8	Population per square mile.
X_9	Average enrollment in Grades 10-12 in secondary schools offering vocational agriculture courses by county.
X_{10}	Proportion of population that is white.
X_{11}	Proportion of employed population that is non-white.
X_{12}	Per capita personal income.
X_{13}	Per cent of persons with income below poverty level.
X_{14}	Proportion of employed population in managerial and professional specialty occupations.
X_{15}	Per cent of 25-years-and-older population that completed 12 or more years of schooling.
X_{16}	Local government expenditure per capita for elementary and secondary education.

The tentative regression model was:

$$Y_i = a + B_1 X_1 + B_2 X_2 + \ldots + B_{16} X_{16} + t,$$

where:

Y_i represents a dependent variable which describes the vocational agriculture subsystem,

$X_1 - X_{16}$ are potential explanatory variables that describe the community system, and

t is the unexplained error.

A preliminary analysis of the data revealed that Level II vocational agriculture courses were not offered in the five counties, and Level III vocational agriculture courses were not offered in 12 counties. For Dependent Variables Y_1, Ratio of Level II enrollment to Level I enrollment, and Y_2, Ratio of Level III enrollment to Level I enrollment, and Y_4, Proportion of Grade 12 students enrolled to Level III vocational agriculture courses, separate analysis were made with the full population of 34 counties, and for restricted populations of 29 and 22 counties.

The regression studies were divided into two parts. The data for each dependent variable were analyzed initially by the PROC RSQUARE procedure, and values of R-square for a series of regression models, both for full and restricted populations, were displayed. Then, in the second part, the data for three of the four variables were analyzed by the analysis of variance, and a stepwise procedure was used to identify an optimum regression model for each variable for full and resticted populations. For each analysis, a value of F was computed, the probability that the true value of F were zero was ascertained, and, where regression models included two or more explanatory variables, the magnitude of the partial regression coefficient was determined. For each partial regression coefficient, a t statistic was computed and the probability determined of obtaining the observed value of t, when the true value was zero was determined.

FINDINGS

Analyses of correlation and regression data indicated that attrition, that is, ratios of enrollment in higher level courses to lower level courses, and enrollment, that is, proportions of selected populations of students enrolled in vocational agriculture courses, are separate and uncorrelated entities; attrition is not a function of enrollment.

Regression analyses further demonstrated that not only was variability in attrition was enrollment data, but it was not explained by the selected explanatory variables in the regression models. For Dependent Variable Y_2, Ratio of Level III enrollment to Level I enrollment, with both total and restricted populations, the PROC RSQUARE analysis demonstrated that not a single explanatory variable met the 0.1 level of significance criterion for initial selection by the stepwise procedure. For Dependent Variable Y_1, Ratio of Level II enrollment to Level I enrollment, the level of significance criterion was met, both for the total restricted populations, but the R-square values, although siginificant, were not potent. The one-variable model selected for the full population accounted for 16.1 per cent of the variability of the dependent variable, and the two-variable model selected for the restricted population accounted for 32.2 per cent of the variability.

The regression analyses of enrollment data yielded different results. For Dependent Variable Y_3, Proportions of students in grades 10-12 enrolled in Level I-III vocational agriculture courses, the two-variable model identified for the full population of 34 counties accounted for 57.6 per cent of the variability in enrollment proportions. For Dependent Variable Y_4, Proportion of students in Grade 12 enrolled in Level III courses, the three-variable model selected by the stepwise procedure accounted for 45.1 per cent of variability in enrollment proportions with the full population of 34 counties, and the three-variable model accounted for 74.1 per cent of the variability in enrollment proportions for the restriced population of 22 counties.

Analyses of data presented indicate that the regression models developed from community based data were more efficacious in accounting of variability of enrollment scores than variablity of attrition scores. The explanatory variables selected by the stepwise-based procedure varied among models, but the most prominent one was Explanatory Variable X_1, Proportion of employed population in agriculture, and explanatory variables that correlated highly with this variable. The analyses by the PROC RSQUARE procedure show that, generally, two or more alternate sets of variables could have been selected for the models without appreciable changes in the R-square values attributed to the models.

CONCLUSIONS

Based on the analysis of data, the following conclusions pertinent to the population defined are presented:

1. Variability of attrition, the study of which was the primary objective of this study, was inadequately explained by the community characteristics selected as explanatory variable. Further, a basic assumption regarding the correlation between attrition and enrollment notwithstanding, it was concluded that attrition, as defined herein, is not a function of enrollment, as defined herein; they are separate and uncorrelated entitites. Hence, given the results of the regression analyses, the correlation data, and the patterns of enrollment in vocational agriculture courses as presented herein, it was tentatively concluded that the principal sources of variability of attrition ratios are

lodged largely within educational systems themselves (cf. Recommendation No.2).

2. Closely related to Conclusion No. 1 is the tentative conclusion that enrollment in the pursuance of three- and four-year vocational agriculture programs is the exception rather than the rule in the 34 counties studied. This tentative conclusion was based largely on the data presented, and it merits further study (cf. Recommendation No. 2; Recommendation No. 3).

3. Variability in enrollment in vocational agriculture programs in secondary schools, defined as the proportion of secondary school students enrolled in these programs, is principally a function of employment in agriculture in the county, defined in relative, i.e., proportional, not absolute, terms. Explanatory Variables X_1, Proportion of employed population in agriculture, and X_3, Proportion of employed population in agricultural related occupations, ranked higher in explanatory power than absolute variables, such as Explanatory Variable X_5, Value of agricultural products sold.

4. Closely related to Conclusion No. 3 is the conclusion that economic characteristics contributed more to explaining variability in proportions of students enrolled in vocational agriculture courses than sociological variables. The report of the Committee on Agricultural Education in Public Schools (1988) and the mongraphs of Singelmann (1978) and Fuchs (1968) notwithstanding, neither race-oriented variables, derived from the Committee report, nor income-oriented variables, prompted by Singelmann and Fuchs data, were strong explainers of variability of proportions of students in grades 10-12 enrolled in advanced levels of vocational agriculture courses (cf. Schroeder, Sjoquist, and Stephan, 1986).

5. Closely related to Conclusions No. 3 and No. 4 is the conclusion that , based on PROC RSQUARE analyses, explainers of variability in enrollment proportions are not single dimensional. The data presented in the PROC RSQUARE tables show a common pattern of near-equal R-square values for two or more variables. In some instances, the pattern of R-square values was described as substitutive, not additive. The sets of explanatory variables that yielded comparable R-square values within a model permit a tentative conclusion that sources of variability in proportions of students enrolled in vocational agriculture courses may have been functions of two or more interacting variables.

IMPLICATIONS

The implications of the foregoing conclusions are straightforward. The findings and conclusions presented herein demonstrate forcibly that as the proportion of the employed population in agriculture decreases, as was predicted by Employment Security Commission of North Carolina data (Labor Market Information, 1989), the proportion of secondary students enrolled in vocational agriculture courses will reflect the decreased employemnt. The finding and conclusions presented herein also support predictions of demand for teachers of vocational agriculture as reported by the General Administration of the University of North Carolina (Barnes, Bass, and Wakeford, 1986).

The implications of the findings and conclusions of this study for policy development also are straightforward. It is recommended that policies be developed and adopted at both State and local levels which require that development and continuation of vocationally-oriented agricultural programs in secondary schools be based on accurate and up-to-date agricultural employment data, the collection and dissemination of which is a function of the Employment Security Commission of North Carolina (cf. Division of Vocational Education, 1987; General Assembly of North Carolina, 1984; Labor Market Information, 1989; North Carolina State Board of Education, 1986). This statement however, does not apply to career-oriented or other programs related to agriculture and the agricultural industry designed to attain aims other than vocational aims (cf. Committee on Agricultural Education in Secondary Schools, 1988).

RECOMMENDATIONS

The following recommendations for additional research are suggested, based upon the findings and conclusions of this study:

1. It is recommended that the study be replicated, with, as a minimum, the same variables, but with a different and, possibly, larger population.

2. The study of attrition, the original primary objective of the study, both within vocational agriculture programs and within the entirety of the vocational education arena, merits continued attention and a place in research literature. This study did not produce an adequate theoretical foundation upon which the development of explanatory regression models for the study of attrition could be based. But within the limitations of the theoretical bases and the adequacy of the selected explanatory variables thought to explain variability in attrition scores, the finding and conclusions of the study pointed to possible areas of research which may explain differences in enrollment patterns. Four potential areas of continued research are indicated:

First, it is recommended that a study be undertaken to inquire as to whether regression models can be developed, either based solely on school variables or combined with more promising community variables, taken from this and other studies, which will explain variability to attrition.

Second, it is recommended that the study of attrition be continued initially with the population defined for the present study, but using secondary schools as the units of interest, and educational system variables as potential explanatory variables.

Third, it is recommended that a study be conducted of the influence of state and local policies and practices on the enrollment of students in advanced courses of vocational agriculture, specifically the requirement of a one-year vocational education elective for the State Honors program, the increased proportion of high school students entering two- and four-year colleges, and recent changes in college entrance course requirements.

Fourth, it is recommended that follow-up studies be conducted to track students through high school and placement upon graduation or leaving school in order to obtain further information on the decision-making process with respect to course and career selection. This line of investigation is to point toward assessing students' role in the common decision not to pursue a three- or four-year vocational agriculture program.

3. In the publication entitled *Understanding Agriculture: New Directions for Education*, written by the Committee on Agricultural Education in Secondary Schools (1988), considerable attention was directed toward student enrollment, a major concern of the Committee. The findings and conclusion of this study show promise toward providing information pertinent to these concerns. But additional research along two lines is suggested:

First it is recommended that the regression models developed herein be modified and expanded, with special attention given to adding variables suggested in the Committee report other than those used herein. In addition to searching for additional, possibly more powerful, explanatory variables, two strategies are indicated. The results of the PROC RSQUARE analyses, which demonstrated that two or more variables produced nearly equal R-square values in accounting for variability, suggest that one or more "umbrella" variables may be identified under which variables with near-equal R-square values may be subsumed. Further, investigation of possible interactions of community and educational system variables in regression models, in which the joint presence of two or more variables may produced higher R-square values than the variables taken singly, is indicated.

Second, it is recommended that the scope of further studies along the lines reported and recommended herein be expanded to include, as a minimum, the entire 100-

county population of North Carolina, and, if feasible, that the line of studydescribed herein be extended to other states.

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Coefficients of correlation between dependent and explanatory variables, and intercorrelations among explanatory variables.[a,b,c]

	Dependent variables				Explanatory variables															
Explanatory variables	Y_1	Y_2	Y_3	Y_4	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}	X_{12}	X_{13}	X_{14}	X_{15}	X_{16}
X_1. EPA. Employed population agric . .	$\underline{322}$	066	705	463	1000															
X_2. POF. Principal occupation farming .	$\underline{303}$	$\underline{193}$	276	019	683	1000														
X_3. EARO. Employed agric related occup .	$\underline{376}$	$\underline{007}$	602	340	923	761	1000													
X_4. TEF. Proportion earnings farming .	$\underline{242}$	$\underline{102}$	374	125	610	322	448	1000												
X_5. VFS. Value agric products sold . .	$\underline{057}$	006	380	185	437	433	465	262	1000											
X_6. FPI. Farm personal income	060	$\underline{124}$	216	$\underline{040}$	300	324	391	252	648	1000										
X_7. PPR. Proportion population rural .	$\underline{177}$	161	586	410	724	383	579	715	107	002	1000									
X_8. PPSM. Population per square mile .	058	$\underline{149}$	$\underline{572}$	$\underline{317}$	$\underline{687}$	$\underline{542}$	$\underline{595}$	$\underline{578}$	$\underline{237}$	$\underline{095}$	$\underline{867}$	1000								
X_9. THYREN Enrollment in Grades 10-12 .	081	$\underline{145}$	$\underline{565}$	$\underline{373}$	$\underline{526}$	$\underline{195}$	$\underline{420}$	$\underline{483}$	$\underline{399}$	$\underline{398}$	$\underline{447}$	337	1000							
X_{10}. PW. Proportion population white .	384	173	$\underline{091}$	044	$\underline{457}$	$\underline{658}$	$\underline{592}$	$\underline{321}$	$\underline{041}$	$\underline{147}$	$\underline{287}$	241	080	1000						
X_{11}. EPNW. Employed population non-white	$\underline{401}$	$\underline{167}$	097	$\underline{032}$	469	626	600	347	056	139	295	$\underline{227}$	$\underline{111}$	$\underline{990}$	1000					
X_{12}. PCI. Per capita income	187	$\underline{076}$	$\underline{471}$	$\underline{286}$	$\underline{671}$	$\underline{571}$	$\underline{652}$	$\underline{373}$	005	103	$\underline{705}$	735	198	595	$\underline{566}$	1000				
X_{13}. BPL. Income below poverty level .	$\underline{367}$	$\underline{094}$	374	188	738	767	750	460	212	189	475	$\underline{462}$	$\underline{236}$	$\underline{797}$	768	$\underline{724}$	1000			
X_{14}. PPMO. Proportion managerial occup .	025	$\underline{208}$	$\underline{432}$	$\underline{321}$	$\underline{551}$	$\underline{358}$	$\underline{468}$	$\underline{409}$	$\underline{108}$	044	$\underline{730}$	701	345	216	$\underline{199}$	711	$\underline{316}$	1000		
X_{15}. EDU. Proportion 12+ years schooling	098	$\underline{084}$	$\underline{458}$	$\underline{249}$	$\underline{687}$	$\underline{545}$	$\underline{608}$	$\underline{529}$	$\underline{142}$	$\underline{051}$	$\underline{805}$	768	363	395	$\underline{377}$	764	$\underline{548}$	898	1000	
X_{16}. PCE. Per capita expenditure educat	$\underline{228}$	$\underline{167}$	105	$\underline{022}$	417	408	448	262	241	248	277	$\underline{262}$	$\underline{026}$	$\underline{504}$	460	$\underline{401}$	601	$\underline{239}$	$\underline{386}$	1000

[a] Decimals omitted. [b] Negative coefficients underscored. [c] For sources of data, see Table 6, *supra*, pp. 48-55.

ATTRITION IN NORTH CAROLINA SECONDARY SCHOOL VOCATIONAL AGRICULTURE COURSE AS A FUNCTION OF COMMUNITY CHARACTERISTICS

A Critique

Donald M. Johnson, Mississippi State University-Discussant

This study was designed to determine if specific community level factors could be used to develop prediction models capable of explaining significant proportions of the variance in secondary agricultural education course enrollment and student attrition. This is important research.

The statement of the research question was clear and easily understood. Valuable space could have been saved by eliminating the statement of objectives.

The methodology section provided a good description of the research procedures. I was especially pleased to see that the researchers provided empirical justification for the 16 independent variables included in the study. However, no information was given as to the source of data for these 16 variables. This is an important omission.

An interesting finding of this study was that enrollment and attrition were not related. This appears to defy logic. Can the researchers offer additional insight into this apparent contradiction?

The proportion of variance in attrition explained by the regression models is described as "not potent." While this may be somewhat of an overstatement (especially as applied to the Y_2 variable), the authors make a reasonable conjecture when they conclude that variability in attrition is "lodged largely within the educational systems themselves" (p. 4). The recommendations for further research in this area are most appropriate.

Regression models were capable of explaining large percentages of the variability in enrollment (Y_3 and Y_4). As might well be expected, proportional enrollments in agriculture increased with increases in proportional agricultural employment in the county. The authors make sound and appropriate conclusions and recommendations based on this finding.

The intercorrelations among the explanatory variables (Table 1) provide some interesting (if disturbing) insights into the socioeconomic characteristics of the counties studied. I encourage the researchers to further analyze this data in order to reach a deeper understanding of these community level relationships.

I commend the researchers for conducting a most valuable study. I look forward to their efforts to extend this line of inquiry.

CHARACTERISTICS OF THE DAIRY INDUSTRY IN THE 21st CENTURY WITH IMPLICATIONS FOR CURRICULUM DEVELOPMENT IN AGRICULTURAL EDUCATION

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CHARACTERISTICS OF THE DAIRY INDUSTRY IN THE 21ST CENTURY, WITH IMPLICATIONS FOR CURRICULUM DEVELOPMENT IN AGRICULTURAL EDUCATION

INTRODUCTION

No one knows exactly what the work environment of the next century will be like, but it will certainly be characterized by rapid, continuous change. Educational programs, such as agricultural education, must train today's student with skills that will be needed in tomorrow's workplace. The curriculum must be futuristic in nature to give the students the opportunity to develop these skills. In today's rapidly changing world, information is often outdated by the time it is published. The task of the curriculum planner has become increasingly difficult. Educators must use futuristic research as a means for keeping the curricula current. A futuristic strategy utilizing the Delphi technique may be needed to accomplish this goal. The Delphi technique has been used in government, industry, medicine, regional planning, program planning, policy formation, and problem identification and solutions (Flanders, 1988).

It was determined from the literature that only limited information was available about dairy science education in the future. Futuristic predictions that were found were in the popular press and had not been tested for validity. It was determined there was insufficient data available to base selection of curriculum content in the area of dairy production. Thus there was a need for this study to be conducted.

PURPOSE AND OBJECTIVES

The purpose of this research was to determine the characteristics of the dairy industry in the 21st century in order to recommend content for agricultural programs of the future.

Specific objectives were to determine:

1. the general characteristics of the dairy industry in the year 2000.
2. a demographic profile of opinion leaders in the dairy industry.
3. if the Delphi technique could be used to acheive consensus among dairy experts concerning the future of the industry.
4. the workforce requirements of the dairy industry and the educational requirements of those employed in the dairy industry in the 21st century.
5. the agricultural education curriculum content needs for dairy science course work in the 21st century.

METHODS AND PROCEDURES

This was a national futures study utilizing a modified Delphi technique. Collection of data consisted of four phases: instrument development, selection of a panel of experts, an initial round, and a final round of the Delphi.

The Delphi survey instrument, consisting of 75 items on a five point Likert-type scale, was developed from dairy industry literature dealing with future directions of the industry. A draft of the instrument was reviewed by a panel of 12 persons who had expertise in the dairy science field, in futures research, and/or in education. The panel evaluated the items for importance and reviewed the instrument for content and face validity.

The top 25 futurists in the dairy industry were selected to participate through a national nomination process. Nominators were chief officers of dairy industry associations, authors, editors and managers of dairy publications and texts, and dairy science and Extension dairy science department heads in the top 25 milk-producing states of 1990. Two hundred and thirty nominations were received. Twenty of the 25 most frequently nominated experts agreed to serve on the panel. The five non-participating experts responded with explanations for their inability to participate. The 20 panelists were geographically dispersed across the United States (Figure 1).

Statistics used to analyze the data included frequencies, composite score, means, percentages, medians, standard deviations, interquartile ranges, Pearson product-moment correlation coefficients, and the Wilcoxon matched-pairs signed-ranks test. Stability of responses between rounds, group agreement, and item ranking were determined using these statistics.

FINDINGS

The 20 members of the expert panel were all males, ranging in age from 35 to 71 years with a mean of 51.45 years. Nine of the experts held the title of Professor or Department Head at universities, eight were Extension Specialists, four were officers in breed, trade, or research associations, two were editors of dairy industry publications, and two were dairymen. Thirteen of those selected to the panel of experts had Ph.D. degrees. The 20 member panel had a total of 563 years of experience in the industry and/or academia. The range of experience was from 12 to 39 years. The mean number of years of experience was 28.15 with a standard deviation of 8.72. A description of the experts is not necessary for the interpretation of the results of the Delphi, but this information can be important in selection of groups for further study.

The standard deviations and interquartile ranges indicated a tendency toward concensus. In 73 items (93.33%), the standard deviations decreased around the mean and the interquartile ranges decreased for 59 items

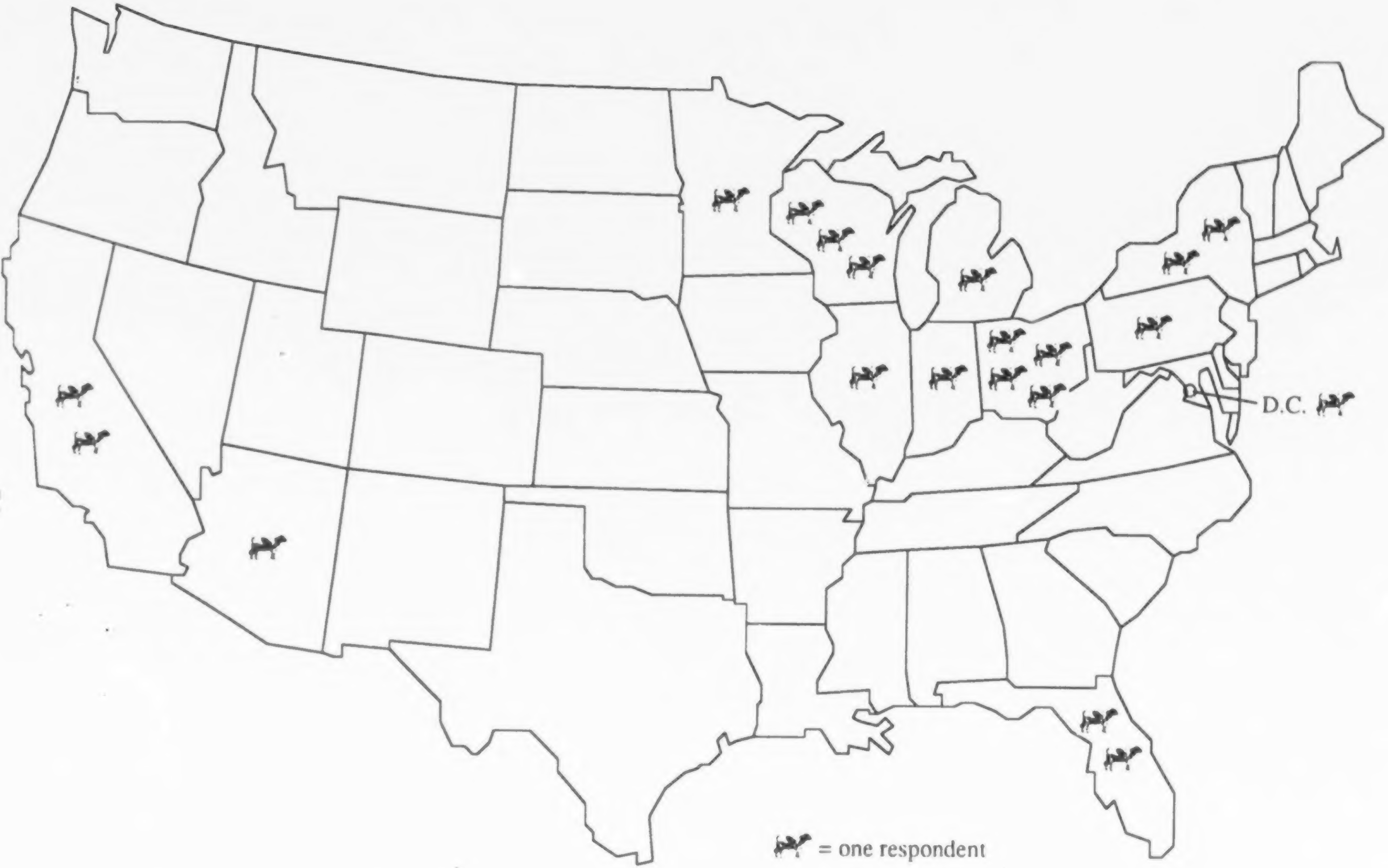
D.C.
= one respondent

Figure 1. Location of the 20 Expert Panel Members Who Participated in the Study

(78.67%); becoming closer to the median. The responses were found to be stable (not significantly changed from round one to round two) in 72 items (96%) using Pearson product-moment correlations and in 70 items (93.33%) using the Wilcoxon matched-pairs signed-ranks test. These tests indicated that further rounds of the Delphi technique would have been of little benefit.

A composite score was calculated on round two data for each item and used to rank the items in order of agreement. The highest ranked items dealt with increased emphasis on forage and fiber analysis in formulating dairy rations, increasing the average cow herd size in the United States, and the utilization of more experts, such as veterinarians, financial counselors, and nutritionists, in dairy management. The items ranked lowest (indicating disagreement) were concerned with BST approval and use being essential to the survival of the dairy industry, availability of drug treatments for use by dairymen, and video cameras being placed in dairies by health inspectors to randomly make quality checks. Those findings are presented in Table 1. Respondents made a total of 555 explanatory comments - 297 in round one and 258 in round two.

Consensus was indicated on an item if (a) at least 60% of the respondents were in agreement, and (b) the composite score was less than 50 or greater than 70; that is, the composite scores were either in the agreement or disagreement range. Seventeen items (22.67%) did not meet the criteria for consensus. Of the 58 items on which consensus was reached, eight items (10.67%) were in the "disagree" range and 50 items (66.67%) were in the "agree" range.

Table 1: Items of Highest and Lowest Rank by Composite Score

Item #	Item Rank	Composite Score	
Highest Ranked Items			
1.	1	97	Dairymen will place additional emphasis on forage and fiber analysis to formulate rations
38.	2	97	The average U.S. dairy cow herd size will rise to 60 or more
51.	3	96	More experts, such as veterinarians, financial counselors, and nutritionists, will be utilized in dairy management
37.	4	95	The number of U.S. dairy farmers will decrease to less than 138,000
64.	5	95	Lowfat and "light" dairy products will capture a larger share of the market
17.	6	94	A nationwide residue penalty program will be implemented.
29.	7	94	Dairy products will continue to be an important part of America's diet.
34.	8	94	Pricing plans that place value on protein or the solids-not-fat components of milk will be placed in the federal pricing system.
62.	9	94	Most of the new technologies will be more management intensive, requiring greater sophistication in managing the dairy enterprise.
53.	10	88	Dairy farms will become larger in order to be more competitive.
Lowest Ranked Items			
21.	66	51	A supply management system, created by dairymen, will be implemented.
58.	67	49	The top three milk-producing states will be California, Wisconsin, and Texas.
19.	68	47	Dairymen, guilty of selling milk containing drug residues, will have their names published.
54.	69	47	At least 15% of all dairy farms will have a milk robot.
4.	70	46	Dairymen will use more storage units of smaller size to allow optimal storage and allocation of various qualities of forage that are harvested.
8.	71	44	Technology will revolutionize the cheese industry by moving a portion of the cheese making procedure to the farm.
71.	72	43	State governments will be completely out of the dairy industry.
42.	73	41	BST will be essential to the survival of the dairy industry.
18.	74	39	There will be no approved drug treatments available for use by dairymen.
57.	75	39	Video cameras will be placed in dairies by health inspectors so they can randomly make quality checks.

CONCLUSIONS

It was concluded that:

1. The dairy industry will grow and change rapidly into the 21st century, especially in the areas of production and marketing. Emerging new technologies will require that vocational education in dairy science be continually kept up to date.

2. Opinion leaders in the dairy industry were educators and researchers with 85% being professionally affiliated with a university. The experts were well educated with 13 of them having a Ph.D. degree. Opinion leaders in the dairy industry can best determine content for dairy science programs of the future.

3. The Delphi technique was effective in determining consensus among dairy industry experts regarding future characteristics of the industry, and program focus for the 21st century could be recommended based on the consensus of experts. Two rounds are adequate in a Delphi study when a structured instrument is utilized.

4. There will continue to be employment opportunities and an increasing need for training programs in dairy science.

5. There is a need to continually update the dairy science curriculum in agricultural education programs. Dairy industry leaders should be used as resource people in the development and updating of curricula.

RECOMMENDATIONS

Eighteen content areas are recommended for inclusion in agricultural education in order to prepare workers for the dairy industry of the 21st century (see Table 2). Dairy science course work in agricultural education should be emphasized and expanded. Preservice programs should include dairy science courses. Inservice workshops for teachers should utilize dairy industry personnel.

Table 2: Curriculum Content Items

Agricultural ethics
Animal breeding and genetic improvement
Biotechnology in dairy science
Career opportunities
Computers in dairy science
Cooperative business organizations
Dairy cattle judging and evaluation
Dairy mechanics and technology
Dairy processing
Farm and agribusiness management
Forage production and management
Herd health
Leadership and personal development
Marketing products and by-products of the dairy industry
Milk secretion
Quality control techniques
Reproductive management
Ruminant nutrition and feeding

IMPLICATIONS

Major changes in the curriculum for dairy science instruction are needed. The dairy industry will need well-trained workers in the future. Agricultural educators can have a decisive role in the future of the industry if futuristic curriculum, faculty, and facilities are utilized.

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Characteristics of the Dairy Industry in the 21st Century with Implications for Curriculum Development in Agricultural Education

A Critique

Michael E. Newman, Mississippi State University--Discussant

This paper makes use of the Delphi technique to reach consensus among dairy industry experts regarding future characteristics of the industry. I view this approach as being proactive and commend the researchers for their effort. The Delphi technique is an appropriate method for this type of research and the researchers carried out the process very efficiently and successfully.

The objectives of the study were well stated and appropriate. The researchers were successful in completing the first three objectives: they described the experts' consensus of the characteristics of the dairy industry in the 21st century; they provided a demographic profile of opinion leaders in the dairy industry; and they determined that the Delphi technique could be used to achieve consensus among dairy experts concerning the future of the industry. Objectives four and five, however, will probably require further study.

I commend the researchers for describing the selection process and the providing characteristics of the expert panel. One concern is that 17 of the 25 panel members were from education or extension. Industry does not seem to be well represented on the panel, however, the selection process was objective and used nominations from appropriate individuals.

The authors also did a nice job of developing a set of conclusions and recommendations from the study. They made it clear that the study should lead to some changes in the way the dairy industry is viewed and in the content of the secondary agricultural education curriculum in dairy science instruction. Some of the conclusions, although laudable, had no basis in the findings of the study reported in this paper. For example, the researchers concluded that there is a need to continually update the dairy science curriculum in agricultural education programs and that dairy industry leaders should be used as resource people in the development and updating of curricula. I agree with these conclusions, but they were not substantiated by the findings presented. Several of the curriculum content items recommended for inclusion in agricultural education programs had little or no justification in the findings presented in the study.

Before making drastic changes in curriculum, the expert panel should be asked to review the existing curriculum. Some of the basic concepts relating to dairy science that are presently being taught should probably be kept, while some may be outdated. These items and the recommended curriculum content items recommended by the researchers should be validated.

A COMPARISON OF COMMUNITY COLLEGE VOCATIONAL-TECHNICAL AND TRANSFER AGRICULTURE STUDENTS

by

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INTRODUCTION AND THEORETICAL FRAMEWORK

Community colleges play a major role in the American system of higher education. According to El-Khawas et al. (1988), 43% of undergraduates and 51% of first-time college freshmen were enrolled in community colleges during the fall 1985 semester.

Vocational-technical and transfer education are important components of the mission of many community colleges. According to Palmer (1986), 64% of all associate degrees awarded in 1981-1982 were in vocational-technical areas. Brawer (1991) reported that, of students completing 12 or more semester hours at a community college, 22% subsequently enroll at a four-year institution.

Despite popularity with students, community college vocational-technical education is not without its critics. Brint and Karabel (1986) charge that vocational-technical education programs reinforce existing inequalities of class, race, and gender. They write that, "...for most community college students...placement in vocational education constitutes relegation to the bottom rung of higher education's tracking system" (p. 11).

Palmer (1986) reviewed studies comparing community college students enrolled in vocational-technical and transfer programs. Based on his review, Palmer (1986) wrote that, "While the average vocational student has a lower academic and socioeconomic profile than the average transfer student, the averages conceal a wide variance in the characteristics of vocational students" (p. 58). He concluded that a large degree of overlap existed in the socioeconomic and academic characteristics of vocational-technical and transfer students. He further concluded that, "Sizable numbers of students enrolled at any one time in vocational programs have the ability and inclination to switch to a transfer program and complete it" (Palmer, 1986, p. 59).

PURPOSE AND OBJECTIVES

The purpose of this study was to develop a profile of agriculture students enrolled in vocational-technical (vo-tech) and college transfer (transfer) programs at selected Mississippi public community colleges. Specific objectives were to describe and compare vo-tech and transfer agriculture students on: (1) selected demographic characteristics; (2) selected academic characteristics; (3) individuals influencing choice of college major; and (4) educational and occupational aspirations.

METHODS AND PROCEDURES

The population for this study was comprised of all students enrolled in the nine Mississippi public community college agriculture programs during the spring 1992 semester (N=503). Of these students, 281 (55.9%) were enrolled in vo-tech programs, while 222 (44.1%) were enrolled in transfer programs. The entire population was included in the study.

Data were collected using an instrument originally developed for use in a 1977 USDA/Cooperative States Research Service (CSRS) study of agriculture students enrolled in southern universities (Project S-114) (Dunkelberger et al., 1982). The instrument has also been used in subsequent studies of university and community college agriculture students (Bowen and Lee, 1985, Taylor, 1991; and Owens, 1986).

Prior to data collection, one agriculture instructor at each community college was contacted by telephone. At this time, the researcher explained the purpose and procedures of the study, obtained current enrollment figures, and invited each instructor to serve as the contact person for his or her college. All of the instructors agreed to cooperate in the study.

In March 1992, survey instruments and a cover letter detailing data collection procedures were mailed to each contact person. The contact person distributed the instruments to his or her students, collected the completed surveys, and mailed the instruments back to the researcher. Data collection was completed in May 1992.

Completed survey instruments were received from all nine community colleges. By group, 194 of 281 (69.0%) vo-tech students and 146 of 222 (65.8%) transfer students provided useable responses. This resulted in an overall response rate of 67.6%. Readers should be aware of the potential for non-response bias in this study. For this reason, the results and conclusions presented are limited to the respondents; generalizations to the entire population of Mississippi pubic community college agriculture students are not warranted without additional study.

RESULTS

The mean age of the vo-tech respondents was 23.62 years (SD=7.68) with a range of 16 to 55 years. The transfer respondent group had a mean age of 20.03 years (SD=2.27) with a range of 18 to 35 years.

Males accounted for a majority of the respondents in both student groups. However, the percentage of females in the vo-tech group was over twice as high as the percentage of females in the transfer group. Table 1 presents information on gender by group and overall.

Whites accounted for the majority of respondents in both student groups. As a percentage, black respondents were twice as likely to be in the vo-tech as in the transfer student group. Table 2 presents a summary of the racial/ethnic composition of the respondents by group and overall.

Table 1

Gender of Community College Agriculture Students

Gender	Student Group					
	Vo - Tech		Transfer		Total	
	n	%	n	%	n	%
Male	154	79.4	133	91.1	287	84.4
Female	40	20.6	13	8.9	53	15.6

Table 2

Racial/Ethnic Origin of Community College Agriculture Students by Group and Overall

Racial/Ethnic Origin	Student Group					
	Vo - Tech		Transfer		Total	
	n	%	n	%	n	%
American Indian	5	2.6	0	0	5	1.5
Black	18	9.4	6	4.2	24	7.2
White	168	88.0	137	95.8	305	91.0
(Missing)	(3)	_	(3)	_	(0)	_

A majority of respondents in both student groups had resided in a rural area for most of their lives. The transfer respondents were more likely to have lived on either a farm or in a non-farm rural area for most of their lives. Conversely, the vo-tech respondents were more likely to have lived a majority of their lives in a town, village, or urban area (Table 3).

Almost one-half (49.0%) of the transfer respondents indicated that their parents either owned, tenant farmed, or leased a farm. Only 35.4% of the vo-tech respondents indicated that their parents owned, tenant farmed, or leased a farm.

The respondents reporting that their parents owned, tenant farmed, or leased a farm were asked to indicate if income from the farm was a primary (>50%) or secondary (<50%) source or family income. A majority of both respondent groups indicated that the farm was a secondary source of family income (vo-tech, 76.2%; transfer, 70.8%).

Table 3
Residence Status of Community College Agriculture Students

Residence	Vo-Tech n	Vo-Tech %	Transfer n	Transfer %	Total n	Total %
Urban (≥ 10,000)	57	29.8	23	25.0	80	23.9
Town or Village (< 10,000)	31	16.2	14	9.7	45	13.4
Rural, non-farm	54	28.3	50	34.7	104	31.0
Rural, farm	49	25.7	44	30.6	93	27.8
(Missing)	(3)	_	2	_	(5)	_

Information was also sought from respondents concerning the highest level of formal education completed by their parents. Parents of vo-tech respondents tended to have completed lower levels of formal education than had the parents of respondents in the transfer group. The vo-tech respondents reported that 17.9% of their fathers and 14.2% of their mothers had not graduated from high school. The transfer respondents reported that 10.3% of their fathers and 6.9% of their mothers had not graduated from high school. Table 4 presents additional information on the educational attainment of the respondents' parents.

Table 4
Parent's Highest Level of Formal Education Completed.

Highest level of Education	Student Group: Vo-tech Father n	Vo-tech Father %	Vo-tech Mother n	Vo-tech Mother %	Transfer Father n	Transfer Father %	Transfer Mother n	Transfer Mother %
< Ninth grade	16	8.9	16	8.7	6	4.1	3	2.1
Some high school, but did not graduate	16	8.9	10	5.5	9	6.2	7	4.8
High School graduate	55	30.7	60	32.8	41	28.3	48	33.1
Postsecondary, but less than B.S.	40	22.4	44	24.0	37	25.5	43	29.6
Bachelors degree	27	15.1	34	18.6	31	21.4	22	15.2
Graduate work	8	4.5	7	3.8	16	11.0	16	11.0
Do not know	17	9.5	12	6.6	5	3.4	6	4.1
(Missing)	(15)	_	(11)	_	(1)	_	(1)	_

Respondents in the vo-tech group reported lower annual parental incomes than did respondents in the transfer group. Of the vo-tech respondents, 12.4% reported their parents had an average annual income of less than $10,000; only 2.1% of the transfer respondents reported an annual parental income of less than $10,000. Additionally, while 40% of the vo-tech respondents reported that their parents had annual incomes of less than $25,000, 71% of the transfer respondents reported that their parents had annual incomes of $25,000 or more.

A majority of vo-tech (77.5%) and transfer (80.1%) respondents had graduated from public high schools. General education diplomas (GED's) had been earned by 6.8% of the vo-tech respondents as compared to 0.7% of the transfer respondents.

Agricultural education courses were offered at 58.4% of the vo-tech respondents' and 55.9% of the transfer respondents high schools. Agricultural education courses had been taken by 41.3% of the vo-tech respondents and 42.5% of the transfer respondents. For those respondents attending schools having agriculture programs, a majority of both the vo-tech (68.5%) and the transfer (75.3%) students reported enrolling in agricultural education courses.

The transfer respondents reported having higher high school GPA's and composite ACT scores than did the vo-tech respondents. However, vo-tech respondents reported earning higher college GPA's than did the transfer respondents. Table 5 presents summary statistics for these academic variables.

Table 5.
Student GPA's and Composite ACT Scores

	Vo-Tech			Transfer			Total		
Variable	n	X	SD	n	X	SD	n	X	SD
High school GPA	189	2.43	.65	145	2.63	.65	334	2.52	.66
College GPA	171	2.83	.61	134	2.69	.52	305	2.77	.58
Composite ACT score	152	16.93	3.55	138	18.02	3.70	290	17.45	3.66

Respondents were provided with a list of 17 individuals thought to be influential in helping to choose a college major. From this list respondents selected the one person they perceived as having the most influence on their choice of major. Table 6 presents the five most frequently selected individuals.

Table 6
Individuals Most Influential in Helping Community College Agriculture Students Choose College Major

	Student Group								
Individual	Vo-Tech			Transfer			Total		
	n	%	Rank	n	%	Rank	n	%	Rank
Father/stepfather	41	25.9	1	41	33.9	1	82	29.4	1
Mother/stepmother	32	20.3	2	17	14.0	2	49	17.6	2
Other relative	21	13.3	4	7	5.8	7	28	10.0	3T
College teacher or advisor	13	18.2	3	15	12.4	3	28	10.0	3T
H.S. Agriculture Teacher	15	9.5	5	8	6.6	5T	23	8.2	5

Vo-tech respondents tended to have lower educational aspirations than did transfer respondents. However, significant percentages of respondents in both groups had relatively high educational aspirations. Of the vo-tech respondents, 23.4% desired to complete a bachelors degree while an additional 40.4% desired to earn one or more graduate degrees. Of the transfer respondents, virtually all (98.6%) desired to earn at least the bachelors degree while 74% aspired to earn one or more graduate degrees.

Using an open-ended question, respondents were asked to list the job they would most desire as a lifetime occupation. The researchers classified each response into one of three categories: (a) farming, (b) non-farm agricultural occupations, or (c) non-agricultural occupations.

A majority of respondents in each group selected non-farm agricultural occupations as their most desired lifetime work. A higher percentage of transfer respondents selected farming as compared to vo-tech respondents. Conversely, a higher percentage of vo-tech respondents selected non-agricultural occupations than did transfer respondents. Table 7 provides a summary of information on desired lifetime occupation by group and overall.

Table 7.
Lifetime Occupation Desired by Community College Agriculture Students

Occupation	Vo-Tech		Transfer		Total	
	n	%	n	%	n	%
Farming	20	12.4	25	20.0	45	15.7
Non-farm agriculture	118	73.3	87	69.6	205	71.7
Non-agriculture	23	14.3	13	10.4	36	12.6
(Missing)	(33)	_	(21)	_	(54)	_

CONCLUSIONS

The results of this study support the conclusions made by Palmer (1986). On average, the vo-tech respondents were more likely to be older, female and/or minority, to come from families with lower levels of education and socioeconomic status, and to have lower educational aptitudes and aspirations than their counterparts in the transfer respondent group.

There was a substantial amount of overlap between the vo-tech and transfer respondents on each of the characteristics studied. Put simply, this means that many respondents in the vo-tech and transfer agriculture programs are very similar in background, ability and aspirations. This supports the conclusion by Palmer (1986) that community college vocational programs do not "serve as a separate, terminal track for less able students."

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A COMPARISON OF COMMUNITY COLLEGE VOCATIONAL-TECHNICAL AND TRANSFER AGRICULTURE STUDENTS

A Critique

Joe W. Kotrlik, Louisiana State University--Discussant

I would like to commend the author for selecting a very timely and important topic. Community college agricultural education programs are very important to the future of our total agricultural education program in the United States.

The purpose and objectives were clearly written and easy to follow. The design of the study, instrumentation, data collection, and data analysis procedures were clearly stated and appropriate for this study. The authors correctly stated that the results of this study can be generalized only to the respondents, not to the entire population of Mississippi public community college agriculture students.

The results section was clearly written and the judicious use of tables in the manuscript helped to communicate the findings of the study. The findings section was very well written.

In an otherwise excellent manuscript, I found two areas in need of improvement. First, the theoretical framework was limited in depth and scope. Much more has been written about the characteristics of community college agriculture students than the theoretical framework would lead one to believe. Ample space was available within SAERM paper length limitations for the author to strengthen this section of the manuscript.

I question the claim made in conclusion two that "There was a substantial amount of overlap between the vo-tech and transfer students on each of the characteristics studied." In conclusion one, the author correctly pointed out the differences that existed between these two groups. The author cannot support the claim made in conclusion two based on the data reported.

I compliment the researchers for conducting this study and want to encourage them to conduct additional research relative to the role of community college agricultural education programs.

A COMPARISON OF THE PERCEPTIONS OF STUDENTS, INSTRUCTORS, ADMINISTRATORS, AND ADVISORY COMMITTEE MEMBERS REGARDING THE FACTORS THAT CONTRIBUTE TO INSTITUTIONAL EFFECTIVENESS

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INTRODUCTION AND THEORETICAL FRAMEWORK

Publication of *A Nation at Risk* (1983) and subsequent education reform reports elevated the awareness of American educational issues of many citizens. As a result of the reform reports, many policy-makers, administrators, educators, and researchers carefully examined and offered numerous alternative strategies to improve education in America. Research efforts have continued to focus on understanding the learner, the learning processes, teacher-learner interactions, and various elements of instruction.

An additional focus during the educational reform movement has been in the area of school effectiveness (Lewis, 1986; Levine & Lezotte, 1990; Wardlow & Swanson 1991, Wardlow, Swanson, & Migler, 1992). The majority of the school effectiveness empirical studies have focused on student level outcomes of schooling and/or on classroom level factors of effectiveness in elementary or secondary schools. Fewer have focused on the contribution of institutional level factors (Wardlow, Swanson, & Migler, 1992).

Levine and Lezotte (1990) classified the correlates of school effectiveness that they identified in an updated review of school effectiveness literature of elementary and intermediate schools under the following headings: (a) productive school climate, (b) focus on student acquisition of central learning skills, (c) appropriate monitoring of school progress, (d) practice-oriented staff development, (e) outstanding leadership, (f) salient parent involvement, (g) effective instructional arrangements, and (h) high operationalized expectations and requirements of students.

In a review of the literature, Wardlow, Swanson, and Migler (1991) found similar elements that contribute to institutional effectiveness. They identified five institutional variables as being associated with effective schools: One, the vision of the head administrator or superintendent and the cohesiveness of central administrative staff. Two, support for school improvement within the contexts of community cultural and political considerations and resource considerations. Three, support of the school board or governing body for the administration of the institution. Four, a political climate which is supportive. Five, the history of the institution within the community.

An assumption could be made that these school effectiveness factors and themes may also apply to vocational education institutions. To test this assumption, Wardlow, Swanson, and Migler (1992) implemented a naturalistic study to identify the key factors that contribute to institutional effectiveness in 14 exemplary vocational institutions from across the United States. An analysis of their data yielded a number of general themes that contribute to effective institutions: school climate, administrator attributes, instructor attributes, student characteristics, curriculum, and institutional marketing/vocational student organizations/support services.

The importance of investigating institutional effectiveness in agricultural education was addressed by the National Research Council and researchers in agricultural education. The National Research Council in *Understanding Agriculture: New Directions for Education* (1988) recommended that:

> exemplary programs in local schools that have broadened the

> curriculum and improved the attractiveness of agricultural education programs should be identified, studied, and emulated. (p. 6)

Program relevance and effectiveness was also identified as one of the four major research problem areas proposed by agricultural education leaders from 31 of the top 100 research institutions in the United States (Buriak & Shinn, 1991). Teacher and program evaluation was one of the three major research activities targeted for additional research within the program relevance and effectiveness problem area.

An institutional effectiveness guide (IEAG) that combined the perceptions of the students, instructors, administrators, and advisory committee members was developed by Wardlow, Swanson, and Joerger (1992) as an initial vehicle for assessing the institutional effectiveness of vocational institutions. The development of the guide, which was based on themes identified by Wardlow, Swanson, and Migler (1992) in a study of 14 exemplary vocational education institutions, was implemented as a final function of the National Center for Research in Vocational Education (NCRVE) Institutional Excellence Project.

PURPOSE AND OBJECTIVES

The purpose of this study, which was a part of the NCRVE effort to develop an institutional effectiveness guide, was to identify and compare the perceptions of the students, instructors, administrators, and advisory committee members regarding the institutional effectiveness themes as presented by Wardlow, Swanson, & Migler (1992). The objectives that guided the research were to:

1. Describe the characteristics of the students, instructors, administrators, and advisory members.
2. Compare the perceptions of students, instructors, administrators, and advisory committee members regarding the major theme areas that contribute to institutional effectiveness.

RESEARCH METHODS AND PROCEDURES

Design

This was a descriptive study that used a pencil and paper survey methodology. The survey instrument, the Institutional Effectiveness Assessment Guide (IEAG), was developed from the themes of institutional effectiveness identified in an interpretive study implemented by Wardlow, Swanson, and Migler (1992).

Sample and Population

Students, instructors, administrators, and advisory committee members from each of the 14 exemplary institutions involved in the NCRVE Institutional Excellence Project (Wardlow, Swanson, & Migler, 1992) formed the populations of this study. Ten students, instructors, and advisory committee members and up to five administrators were selected from each institution to form the samples of each population. All administrators from institutions that had less than five administrators were included in the administrator sample.

Instrumentation

Data were collected using a draft of the 112 item Institutional Effectiveness Assessment Guide (IEAG); students completed a student version of the IEAG and the administrators, instructors, and advisory committee members completed the instructor/administrator/advisory committee member version of the IEAG. The student version was identical to the instructor/administrator/advisory committee member version except that several questions that guide developers felt students were unable to answer were omitted.

The IEAG consists of six major thematic areas which contribute to institutional effectiveness. These six themes are school climate, administrator attributes, instructor attributes, student attributes, curriculum, and institutional marketing/vocational student organizations/support services. A summary of the each theme as reported by Wardlow, Swanson, and Migler (1992) follows to inform the reader of the constructs being addressed in each theme area of the IEAG.

School Climate

Anderson (1982) noted that school climate encompasses the total environment within a school. The four distinct dimensions within the climate dimension are: ecology, which relates to material and physical variables; milieu, which are the background characteristics of the people; social system, which includes variables reflecting the social system of the school; and culture which relates to the values, beliefs, and norms of the people.

Administrator Attributes

Leadership styles, high expectations of self and others, flexibility, strong sense of mission, and vision, and risk-taking are the sub-themes that make up administrator attributes.

Instructor Attributes

Attributes of instructors encompassed in this theme are caring attitude, acceptance of student diversity, high expectations of themselves and the students, creation of positive classroom environment, and high degree of professional and technical competence.

Student Attributes

Students in exemplary institutions exhibit a great feeling of pride in their institutions and within themselves, possess a positive feeling about being involved in their programs, maintain professional standards about themselves, believe that entry into their programs is by a selective process, and they place high expectations upon themselves.

Curriculum Development

A holistic, or dual curriculum is taught that integrates the key principles and practices of vocational and academic education. The curriculum development theme is comprised of three important sub-themes: (a) Industry or community-based advisory committees strongly influence the content of the program offerings. (b) The content is tempered by the teaching methodology concerns of the instructors who work closely with the advisory committees. (c) Instructors maintain a strong sense of ownership of their curricula.

Institutional Marketing/Vocational Student Organizations (VSO's)/Support Services

Institutional programs are effectively marketed in appropriate service areas by exemplary institution personnel. Active VSO's are provided for students by committed and knowledgeable staff members who often serve as VSO advisors. Support services exist and include general education programs, career counseling, and placement programs for students, and clerical support for instructors.

Reliability Measures

The coefficient of stability for the instructor/administrator/advisory committee member version of the IEAG was determined through test-retest procedures. The coefficient of stability for the student version was not determined. As noted earlier, it was identical to the instructor/administrator/advisory committee member version except for several questions. The theme area reliability estimates ranged from .79 to .93. The overall weighted instrument reliability estimate was .84.

Coefficients of internal consistency, as measured by Cronbach's Alpha, were determined for the two versions of the IEAG. The coefficients of internal consistency for the student and instructor/administrator/advisory committee member versions of the IEAG were .92 and .97, respectively.

Data Collection Procedures

The two versions of the Institutional Effectiveness Assessment Guide (IEAG) along with administration instructions were sent to contact persons at each of the 14 exemplary institutions. Follow-up letters and phone calls were made to contact persons of the participating institutions. Additional follow-up communications were implemented at two additional two-week intervals. The due dates were extended to institutions who made such requests.

As noted earlier, study participants completed either the student version or the instructor/administrator/advisory committee member version of the IEAG. Participants responded to IEAG questions by circling one of five possible responses: one for 'almost never', two for 'occasionally', three for 'usually', four for 'almost always', and zero for 'not observed'. Higher scores indicated a stronger perception of the presence of the factor or theme being assessed.

Nine of the 14 (64.29%) of the institutions returned useable instruments from 80 students, 87 instructors, 36 administrators, and 61 advisory committee members. The data from these participants were used to calculate the coefficient of internal consistency. A second set of instructor/administrator/advisory committee member IEAGs was sent to contact persons in three institutions for readministration to participants two to three weeks after the first administration. Twenty four instructor/administrator/advisory committee member IEAGs were used to establish the coefficient of stability using test-retest procedures.

Data Analysis Procedures

The SPSS/PC+, Version 4.0 (Norusis/SPSS, Inc., 1990) computer software was used to analyze the data of the IEAGs. Descriptive statistics were used to describe the demographic characteristics of the participants. Likewise, descriptive statistics were used to describe the themes within the two versions of the IEAG. Analyses of variance (ANOVA) procedures and Tukey - HSD follow-up procedures were used to compare the perceptions of students, instructors, administrators, and advisory committee members.

The internal consistency coefficient was established using the reliability analyses procedures of the SPSS/PC+ program. In order to establish the coefficient of stability of the instrument, a test-retest procedure was employed. The initial and retest scores for the theme areas of the IEAG of the participants were correlated to establish the final coefficient of stability for the IEAG. The alpha for the analyses was established at .05 a priori.

FINDINGS

Respondent Characteristics

Demographic information was requested from participants to provide an overview of the respondents and to provide information an understanding of their ability to appropriately respond to the IEAG questions. Participants from nine of the 14 (64.29%) participating institutions were associated with either a secondary, technical or community college, postsecondary proprietary, or four year college institution.

There were 41 females (51.30%) and 39 males (48.80%) in the student sample. Twenty-two (61.10%) male administrators and fourteen (38.90%) females made up the administrator sample. There were fifty-one male (58.60%) instructors and 36 (41.40%) females in the instructor sample. There were 61 advisory committee members in the study; 39 (63.90%) of the advisory committee members were males and 22 (36.10%) were females.

Comparative Data

School Climate

The data in Table 1 indicate that the student perceptions ($\bar{x}$ 91.29, SD 18.89) of the presence of school climate factors were significantly lower than the perceptions of the instructors ($\bar{x}$ 107.10, SD 18.33), administrators ($\bar{x}$ 117.32, SD 12.44), and advisory committee members ($\bar{x}$ 100.63, SD 26.03). In addition, the administrators ($\bar{x}$ 117.32, SD 12.44) perceived the factors within the school climate theme to be significantly more evident than did the advisory committee members ($\bar{x}$ 100.63, SD 26.03).

Administrator Attributes

The administrators ($\bar{x}$ 48.68, SD 5.16) indicated significantly greater presence of positive administrator attributes than did the advisory committee members ($\bar{x}$ 40.12, SD 14.47). However, the perceptions of the administrator attributes held by the instructors ($\bar{x}$ 43.33, SD 10.03) were similar to those held by the administrators. This suggests that administrators rated their perceptions of the presence of administrator characteristics -- leadership, high expectations, risk-taking, and flexibility -- similarly to the way instructors rated them, but higher than the advisory committee members rated them. Students were not instructed to respond to items in this theme area.

Instructor Attributes

The data in Table 1 indicate there were no significant differences in the ways that the students, instructors, administrators, and advisory committee members perceived the presence of the instructor attributes. This suggests these groups agreed on the degree of caring and acceptance of student diversity demonstrated by the instructors. Further, there was consensus between the groups regarding the professional competence of the instructors, as well as the abilities of the instructors to maintain a positive learning climate.

Table 1

Comparisons of the IEAG Themes by the Role of the Participant

Theme	Mean	SD	F-Ratio	F-Prob.*
School Climate				
Combined	102.27	21.68	15.35	.00
Students	91.29^{1,2,3}	18.89		
Instructors	107.10^{2}	18.33		
Administrators	117.32^{2,4}	12.44		
Adv. Com. Mbrs.	100.63^{1,4}	26.03		
Administrator Attributes				
Combined	43.28	11.44	6.42	.00
Students	17.51	5.33		
Instructors	43.33	10.03		
Administrators	48.68^{1}	5.16		
Adv. Com. Mbrs.	40.12^{1}	14.47		
Instructor Attributes				
Combined	70.58	12.76	1.44	.23
Students	71.53	9.61		
Instructors	72.12	10.51		
Administrators	68.59	15.81		
Adv. Co. Mbrs.	68.35	16.58		
Student Attributes				
Combined	53.02	13.35	7.29	.00
Students	56.50^{3}	8.21		
Instructors	53.24^{1}	11.10		
Administrators	55.42^{2}	10.93		
Adv. Co. Mbrs.	46.44^{1,2,3}	19.83		
Curriculum Dev.				
Combined	34.54	10.77	2.40	.09
Students	7.02	3.44		
Instructors	33.01	11.61		
Administrators	37.61	9.00		
Adv. Co. Mbrs.	34.90	10.21		
Instit. Marketing/Student Org./ Support Services				
Combined	33.91	10.06	5.62	.01
Students	31.00^{1,2}	9.64		
Instructors	35.48^{2}	8.26		
Administrators	38.31^{1,3}	7.35		
Adv. Co. Mbrs.	32.83^{3}	12.84		

Notes: * Alpha = .05 $^{1-4}$ Like superscripts within each thematic area indicate significant differences between the means.

Student Attributes

A comparison of the mean scores of student attributes in Table 1 indicates that the advisory committee members ($\bar{x}$ 46.44, SD 19.83) indicated a significantly lower perception of the presence of the student attributes than the instructors ($\bar{x}$ 53.24, SD 11.10), administrators ($\bar{x}$ 55.42, SD 10.93), and the students themselves ($\bar{x}$ 56.50, SD 8.21). The instructors, administrators, and students held similar views regarding the presence of the student attributes.

Curriculum Development

The data in Table 1 indicate that there were no differences among the perceptions of the instructors ($\bar{x}$ 33.01, SD 11.61), administrators ($\bar{x}$ 37.61, SD 9.00), and advisory committee persons ($\bar{x}$ 34.90, SD 10.21) in regard to the presence of the factors within the curriculum development theme. This suggests that there was agreement among the groups of participants on the perceived value of the role of the advisory committee, the degree to which instructors delivered a dual curriculum, and the sense of ownership of the curriculum displayed by the instructors.

Institutional Marketing/Vocational Student Organizations/Support Services

Analyses of the data in Table 1 indicate that the instructors ($\bar{x}$ 35.48, SD 8.26) and administrators ($\bar{x}$ 38.31, SD 7.35) perceived there to be a significantly greater presence of the factors within this theme area than did the students ($\bar{x}$ 31.00, SD 9.64). Further, the administrators indicated that there was a significantly greater presence of the theme area than did the advisory committee members ($\bar{x}$ 3.83, SD 12.84). A possible explanation for these findings may be that the administrators and instructors may have been more aware of the institutional marketing efforts, vocational student organizations, and support services than either the students or the advisory committee members.

CONCLUSIONS AND RECOMMENDATIONS

This study was part of a project implemented by the National Center for Research in Vocational Education to develop an institutional effectiveness guide. The study sought to compare the perceptions of students, instructors, administrators, and advisory committee members regarding the presence of the factors within the six themes that contribute to institutional effectiveness as presented by Wardlow, Swanson, and Migler (1992).

The perceptions of the institutional effectiveness factors held by the students, instructors, administrators, and advisory committee members of the 14 exemplary vocational education institutions were often different. Knowledge of the nature of the differences in perceptions as found in this study may be very helpful when identifying, developing, implementing, and evaluating group strategies for institutional and program improvement.

There are two ways that the findings from this study may be used by professionals in vocational education. The mean institutional effectiveness theme scores of the students, instructors, administrators, and advisory committee members of the exemplary institutions may be used as initial benchmarks for institutions that use the IEAGs as a vehicle to facilitate discussions and programmatic efforts for institutional improvement. In addition, the institutional level themes and data may provide agricultural educators and researchers common reference points and procedures for examining effectiveness and excellence in exemplary programs in local schools that have "broadened the curriculum and improved the attractiveness of agricultural education programs".

As a result of implementing this study the researchers offer the following recommendations for consideration: One, the IEAG should be used in field tests in institutions and agricultural education programs to assess the perceptions of students, instructors, administrators, and advisory committee members. Two, researchers in agricultural education should use the IEAG along with other school effectiveness measures to further study and report the findings about exemplary schools and programs that have broadened the curriculum and improved the attractiveness of agricultural education. Three, the IEAG should be further refined by using additional themes and data that are derived from studies of agricultural education institutions and programs.

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A COMPARISON OF THE PERCEPTIONS OF STUDENTS, INSTRUCTORS, ADMINISTRATORS, AND ADVISORY COMMITTEE MEMBERS REGARDING THE FACTORS THAT CONTRIBUTE TO INSTITUTIONAL EFFECTIVENESS

A Critique

Donald M. Johnson, Mississippi State University-Discussant

The theoretical framework for this study was based on school effectiveness literature. Research in this area has identified several correlates of effective schools (as defined by various measures). Such research is certainly worthwhile; however, educators must be careful not to infer cause and effect relationships between these correlates and school effectiveness. Thus, it is problematic to posit that these factors "contribute to institutional effectiveness" (p. 1).

The purpose and objectives did not fully describe the research problem. Rather than assessing the perceptions of the effectiveness themes, the researchers assessed perceptions of the frequency with which these themes occurred. This emphasis on frequency (as opposed to importance, desirability, etc.) should be explicitly stated in the paper's title and in the purpose and objectives section.

The population for this study was composed of students, instructors, administrators, and advisory committee members from 14 previously identified exemplary institutions. How were these institutions identified? An institutional response rate of 64.29% was achieved. As a percent of potential respondents, what was the response rate by group and overall?

Interpretation of the findings would have been enhanced if the possible range of scores had been given for each of the six summated thematic scales. The practical significance of a difference between groups is impossible to assess without such information. The text of the paper states that, "Students were not instructed to respond to items in this [administrator attributes] theme area." However, in Table 1, a mean of 17.51 and a standard deviation of 5.33 are reported for students' perceptions of administrator attributes.

The researchers generalize the conclusions and recommendations to all 14 exemplary institutions. Since respondents representing only nine institutions participated, on what basis are these generalizations made? Overall, the researchers' recommendations for further research are well-stated and appropriate given the nature and size of the population studied.

I commend the authors for extending effective schools research into vocational education settings. This is an area which has been neglected for too long by all educational researchers. I am certain the authors will answer many of my questions in their response.

A COMPARISON OF TEACHING PERFORMANCE AMONG MIDDLE GRADE CAREER EXPLORATION TEACHERS WITH VARIABLE CERTIFICATION LEVELS AND ATTRIBUTES

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A COMPARISON OF TEACHING PERFORMANCE AMONG MIDDLE GRADE CAREER EXPLORATION TEACHERS WITH VARIABLE CERTIFICATION LEVELS AND ATTRIBUTES

INTRODUCTION

Education for middle school students has attracted the attention of the agricultural profession as the profession assesses the status of enrollment in high school level agriculture programs and FFA membership. The National Task Force on Middle School Agricultural Education (1991) suggested that because of the nature and maturity level of the middle school student, the curriculum should include agricultural literacy and career exploration topics. Career exploration, as defined by the Vocational Education Program of Studies (1987), is an instructional component in the continuum from career awareness to occupational proficiency. Designed for the sixth, seventh, or eighth grade student, the program is career guidance oriented and serves as a precursor to more sophisticated skill-specific vocational training programs provided in grades nine through twelve.

In North Carolina, the student may or may not have an agriculture teacher as their Career Exploration teacher. By its exploratory nature, the career exploration program covers a broad spectrum of diverse topics directed toward enhancing the student's awareness of the world of work and understanding of the processes required for making informed career decisions. Knowledge and skills acquired by the student are generic to all vocational and many academic program areas pursued by the high school student.

The movement by the North Carolina Department of Public Instruction toward increased site-based decision making and accountability accentuates the necessity for local school administrative units to integrate planning, use of resources, and instructional delivery among disciplines, wherever such consolidation of effort can result in increased efficiency and effectiveness. As local planners seek to creatively administer resources, one obvious strategy rests with having instructional personnel teach in more than one subject and/or discipline area. The practice may be especially prevalent in small school districts or in schools with small student populations. With enabling department of public instruction policy in place, added credence is afforded interdisciplinary teacher assignment.

Traditionally, the majority of teachers of career exploration have matriculated from the ranks of skill-specific vocational education program instructors at the junior and senior high school levels. Notwithstanding the norm, some career exploration teachers have taught in other, non- vocational education programs and disciplines prior to being assigned to career exploration programs. Without regard to student or teacher performance, there appears to be an assumption among many administrators and teachers that because career exploration is pre-vocational in nature and is, by all rights, a vocational education program, vocational education teachers can more appropriately teach the program.

The Division of Teacher Education and Certification Services of the North Carolina Department of Public Instruction currently requires that applicants for certification in the career exploration program area hold vocational education certification in at least one related skill-development program area, such as agriculture, marketing education, Technology Education, Business Education, or Vocational Industrial Education. Prior to the current revision of the Certification Manual: North Carolina Professional School Personnel, (1989), a number of applicants who did not hold prior vocational education program area certification were awarded career exploration certification through a variety of avenues, such as lateral entry and special exception requests. Current data place the proportion of practicing career exploration teachers in North Carolina's public schools who did not hold prior vocational education program area certification at 11.85%. Teaching performance expectations of teachers who fall within this category are identical to those for all other career exploration teachers, as are expected student outcomes.

Research on the relationship of teacher effectiveness to teacher demographic variables abounds. A broad spectrum of subject groups composed the populations studied, including teacher assistants, student teachers, elementary teachers, high school teachers, community college instructors, and college professors. Teacher effectiveness criteria employed included student assessment, self-assessment, peer assessment supervisor assessment, identified practices lists, teacher effectiveness standards, and assorted categorical groupings for performance activities of teachers. Measurement instruments ran the gamut and included surveys, structured interviews, expert opinion scales, informal and formal performance appraisal forms, check-lists, and descriptive data collection forms. Statistical analysis encompassed numerous approaches ranging from simple comparison and ranking of descriptive data to highly sophisticated statistical procedures.

Findings reflected a "mixed bag" of relationships and degrees of relationship. Rush (1985) found a positive correlation between teacher effectiveness and all demographic variables studied, yet conceded that most of the variance in teacher effectiveness could not be explained by education, age, or experience. Fusi (1982) found that teachers' and students' ratings of teaching effectiveness, analyzed according to each of seven demographic variables, showed no statistically significant relationship between teaching effectiveness and any of the variables of interest. Hedges and Papritan (1987), examining the attitudes of experienced vocational agriculture teachers concerning proper ingredients for excellence in teaching, found no demographic variables named in the eight characteristics identified.

Such disparity in findings may have been appropriately described by Vincent (1969) who noted, In the absence of definitive measures of teacher performance, the teacher variable will continue to be a difficult one to control. In general, a great body of research reflected little relationship between demographic characteristics of teachers and teacher effectiveness. Some studies did, however, show significant relationships on some demographic variables; some for all; some for none. Findings were thus mixed on the issue. No research was found which compared the relationship of teacher effectiveness and certification type or level. Is vocational certification an important credential for measuring middle school teachers teacher performance?

PURPOSE AND OBJECTIVES

The primary purpose of this study was to compare the teaching performance, as measured by the North Carolina Teacher Performance Appraisal Instrument, of career exploration teachers who held prior vocational education certification with the teaching performance of career exploration teachers who did not hold prior vocational education certification in the public schools of North Carolina. A secondary purpose was to compare teaching performance using selected demographic variables. In addition to prior certification category, the teacher demographics of level of certification, gender of the teacher, average class size taught, years of teaching experience, and age of the teacher were assessed for significance to teaching performance.

Specifically, the objectives of the research were to answer the following questions:

1. Is there a significant difference, as measured by the North Carolina Teacher Performance Appraisal Instrument, between the teaching

performance of career exploration teachers in North Carolina who hold prior vocational education certification and teachers who do not hold prior vocational education certification?

2. Is there a significant difference, as measured by the North Carolina Teacher Performance Appraisal Instrument, in the teaching performance of career exploration teachers in North Carolina with "A" certification, teachers with "G" certification, and teachers with "above G" certification?

3. Is there a significant difference, as measured by the North Carolina Teacher Performance Appraisal Instrument, between the teaching performance of male and female career exploration teachers in North Carolina?

4. Is there a significant relationship between the average class size taught by career exploration teachers in North Carolina and their teaching performance, as measured by the North Carolina taught by career exploration teachers in North Carolina and their teaching performance, as measured by the North Carolina Teacher Performance Appraisal Instrument?

5. Is there a significant relationship between the age of career exploration teachers in North Carolina and their teaching performance, as measured by the North Carolina Teacher Performance Appraisal Instrument?

6. Is there a significant relationship between the years of teaching experience of career exploration teachers in North Carolina and their teaching performance. as measured by the North Carolina Teacher Performance Appraisal Instrument?

METHODS AND PROCEDURES

The research design selected for the study was descriptive, with a correlational component. The dependent variable was teaching performance, and the independent variables were prior certification category, level of certification, gender, age, average class size taught, and years of teaching experience. The population for the study was all career exploration teachers N = 953) teaching in North Carolina's public schools during the 1990-91 academic year. Two subgroups of interest were all career exploration teachers who held prior vocational education certification and all career exploration teachers who did not hold prior vocational education certification. A stratified random sample was taken to ensure that both teachers who held prior vocational education certification and teachers who did not hold prior vocational education certification were appropriately represented.

Instrument design replicated the teaching performance rating categories on the North Carolina Teacher Performance Appraisal Instrument and added descriptive categories to provide data required to answer all research questions. The categories measured by the instrument on a six point scale include: Management of Instructional Time, Management of Student Behavior, Instructional Presentation, Instructional Monitoring of Student Performance, Instructional Feedback, Facilitating Instruction, Interacting with the Educational Environment, and Performing Non-vocational Duties. The instrument was submitted to expert panels and field tested with the profession to establish validity and reliability.

Requests for data were mailed on May 10, 1991, with a requested return deadline of May 31, 1991. One hundred thirty-four responses were received. A follow-up was mailed to non- respondents on May 30, 1991, with a requested return deadline of June 10, 1991. An additional 91 responses were received. A telephone interview was conducted with a ten percent random sample of those individuals who had not responded by June 10, 1991, and the survey instrument was administered via the interview. This procedure produced three additional responses, for a total of 228 responses (64.77% of the sample). Data from late respondents (those who responded after receiving the follow-up letter and those who were interviewed via phone) were compared statistically to data from early respondents. No significant difference was indicated between early and late respondents when t-tests were used to analyze the data. Therefore, the sample data were assumed to be representative of the population and were combined for research purposes.

Descriptive statistics, including means, medians, and standard deviations, were used to describe the population. Inferential procedures were used to consider the research questions. These procedures included t-tests for the variables of level of certification, gender and prior certification category, and Pearson r correlations for the variables of age, years of teaching experience, and average size of classes taught. Davis conventions were used to describe the strength of the relationships or practical significance. An alpha level of .05 was established a priori for the study. However, to control for experiment-wise error due to multiple comparisons performed in this study, individual tests were conducted utilizing an alpha level of .01.

RESULTS AND/OR FINDINGS

No significant differences were found between the teaching performance of career exploration teachers who held prior vocational certification and those who did not for the eight teaching functions defined by the North Carolina Teacher Performance Appraisal instrument. No significant differences were found in teaching performance when comparing male and female teachers. However, there was a significant difference between teachers with "A" level (baccalaureate) (M= 4.60) certification and "G and above" level (master's or higher) (M= 5.05) on the teaching function of interacting with the environment (t= 2.98).

No significant relationships were found between age and class size and the teaching performance level. As displayed in Table 1, significant relationships were found between Years of Teaching Performance and the following functions: Instructional Presentation (r=.241), Instructional Feedback (r=.188), and Performing Non-vocational Duties (r=.216). In terms of practical significance, the relationships were low.

Table 1. Relationship Between Years of Teaching Experience and Teacher Performance Ratings by Function.

Teaching Function	n	r
Management of Instructional Time	221	.159
Management of Student Behavior	220	.144
Instructional Presentation	219	.241*
Instructional Monitoring of Student Performance	219	.125
Instructional Feedback	219	.188*
Facilitating Instruction	219	.125
Interacting with the Educational Environment	219	.139
Performing Non-vocational Duties	219	.216*

*p <.01.

CONCLUSIONS AND/OR RECOMMENDATIONS

Whether a Career Exploration teacher possesses vocational certification has little to do with teaching performance as measured by the North Carolina Teacher Performance Appraisal Instrument. However, the more education a teacher has, a master's degree or beyond, the more likely it is that the teacher will perform better in the function of interacting with the educational environment - including students, administrators, community. Age,class size and sex of the teacher have little to do with teaching performance. However it should be noted that those who had larger class sizes tended to have lower teaching performance scores. The more years of teaching experience held by a teacher the better the teacher performs instructional presentation, instructional feedback, and non-instructional duties.

Certification requirements for Career Exploration teachers need to be evaluated to determine what type of preparation is needed for the middle school program. Further research is needed to determine if how successful Career Exploration teachers are in delivering subject matter competencies in the Career Exploration curriculum.

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A COMPARISON OF TEACHING PERFORMANCE AMONG MIDDLE GRADE CAREER EXPLORATION TEACHERS WITH VARIABLE CERTIFICATION LEVELS AND ATTRIBUTES

A Critique

George Wardlow, University of Arkansas -- Discussant

The problem under study is of practical significance to Agricultural Education, particularly in light of increased interest within the profession in broadening the client pool which it serves. The research rightly deserves to be included in the literature base which represent the corpus of knowledge about the profession.

The Introduction section of the paper was well developed and presented a logical set of literature for the issue under question. Mechanically the methodology of the study was basically sound. In reading the paper, a few questions arise. These may be a function of either space constraints or of individual research style. However, I believe that they represent issues which might provide questions for consideration for future research and, if addressed, may improve the quality of the paper.

I believe that a review of related literature should be more than just an annotated bibliography; the researcher must develop a strong theoretical framework for the problem under study by building related theories and knowledge into a cohesive whole which provides a logical argument for why the identified problem warrants attention. In this paper, one is left to wonder why did the authors presented a well-developed review of literature for the problem and then summarized it by offering, "In general, a great body of research reflected little relationship between demographic characteristics of teachers and teacher effectiveness." If I came to this conclusion in developing a theoretical framework for this study, I may not have proceeded with implementation of the study. Further, the last sentence in the Introduction is a question, "Is vocational certification an important credential for measuring middle school teachers teacher performance?" Little theoretical development was offered to lead one to this question.

Research questions four, five and six sought "significant relationships" between variables. What is a significant relationship? Statistical significance of any form of Pearson product-moment correlation coefficient is of virtually no value to interpretation. I am aware that modern computer statistical packages provide such information, but the knowledgeable researcher should determine the components of the output which are useless; this is. In the Methods section "Davis' conventions" were identified (without proper attribution) as a plan for describing the strengths of relationships. The presentation of the Results made no use of them.

While I have reason to believe that the North Carolina Teacher Performance Appraisal Instrument is a widely accepted and respected instrument, I found no evidence of that in the paper. The instrument is not properly referenced. In this particular study, I have some concern about its use. While the paper states that, "The instrument was submitted to expert panels and field tested with the profession to establish validity and reliability," no evidence by way of explanation of such processes was offered to support this contention. Further, I am somewhat skeptical as to whether teachers can truly conduct a self-assessment and self-report on the construct of teaching effectiveness with any reasonable validity and any form of reliability.

There are a few other questions which need clarification. What was the original sample size? The paper reports the use of a stratified random sample; how was this done? Two items in the text were not properly cited nor included in the reference list and one item in the reference list was not used in the text.

THE DETERMINATION OF STATISTICAL SOPHISTICATION OF RESEARCH IN AGRICULTURAL EDUCATION

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INTRODUCTION AND THEORETICAL FRAMEWORK

The empirical-analytic paradigm of research heavily relies on the use of statistics. The impact of using statistics on agricultural education research was recognized by many researchers in the field (Cheek, 1988; Warmbrod, 1986; Mannebach, McKenna, and Pfau, 1984).

Mannebach, McKenna, and Pfau (1984) found that about one-third of the studies submitted for inclusion in the 1974-82 Summaries of Research and Development Activities in Agricultural Education reported the use of statistical techniques. In addressing the research priorities in agricultural education, Warmbrod (1986) suggested that "one area that must receive particular attention is knowledge in the use, interpretation and reporting of the more sophisticated multivariate statistical techniques" (p. 7). Cheek (1988) also suggested the inclusion of more methodological and statistical techniques in vocational education graduate curriculum.

Previous studies concurred that ANOVA, correlations, t-tests, regression, and chi-square tests were among the most frequently used techniques in behavioral research. Most studies found that significant changes in the use of statistical techniques did not occur within a period of ten years (Emmons, Stallings, & Layne, 1990; Eason & Daniel, 1989; Elmore & Woehlke, 1988; Rudolph, McDermott, & Gold, 1985; West, Carmody, & Stallings, 1983; Willson, 1980). Several researchers (Teleni & Baldauf, 1989; Goodwin & Goodwin, 1985a, 1985b) further classified statistical techniques into different sophistication levels and found that only a small proportion of them were at the advanced level.

The classification system developed by Goodwin and Goodwin (1985a, 1985b), which categorized the statistical techniques into basic, intermediate, and advanced levels, was widely used in later studies. A recent study by Bowen, Rollins, Baggett, and Miller (1990) investigated the trends on the use of statistical procedures in selected articles published in the Journal of AATEA. They adopted Goodwin and Goodwin's (1985a, 1985b) system and found that over two-thirds of the procedures used were categorized as basic, 15% as intermediate, while 5% as advanced. They also found that both the number and variety of statistical procedures per article had increased since mid 1970s. The researchers called for further studies on the relationship between the nature of the research problem and the statistical techniques used.

Since educational research is an ongoing process which starts at the determination of a problem followed by execution of research procedures, the subsequent stages of the process, including statistical analysis, are logically influenced by the nature of the research problem.

Therefore, three research hypotheses of this study were (a) the statistical sophistication level of a majority of research in agricultural education was less than advanced; (b) the statistical sophistication of research was related to the problem studied; and (c) the statistical sophistication of research did not change in a ten-year period.

PURPOSES AND OBJECTIVES

The purpose of this study was to describe the status of, and changes in, the statistical sophistication of research in agricultural education in the 1980s. The study also sought to determine the relationship between the statistical sophistication of research and the problem area studied in agricultural education research. Specific objectives of the study were to:

1. describe the statistical techniques used and determine the statistical sophistication of research;

2. describe the problem areas studied;

3. determine the relationship between the statistical sophistication of research and the problem areas studied;

4. determine changes over time in the use of statistical techniques and the levels of statistical sophistication of research in the 1980s.

METHODS AND PROCEDURES

The target population of this study was defined as the quantitative research articles published in the *Journal of Agricultural Education* (JAE, formerly the *Journal of American Association of Teacher Educators in Agriculture*, N=197) in the 1980s. A stratified random sample of 50 articles was drawn from the articles published in two periods (a) 1980-83, and (b) 1986-89. Half of the articles were selected from each of the two time periods.

An instrument was developed in this study. By using Steiner's (1978) classification system, each sample article was classified into one of the four problem areas (a) teacher; (b) student; (c) curriculum, and (d) setting. A panel of 18 experts from 12 different institutions, including agricultural and vocational education researchers and applied statisticians, were selected in validating the statistical sophistication level of each technique. Seventeen of the 18 panel members responded. Each statistical technique was ranked a sophistication level by the experts based on the following criteria (a) statistical techniques at the "basic" level should be understood by average readers who have completed one typical graduate level course in statistics; (b) those at the "intermediate" level should be understood by average readers who have completed two typical graduate level courses in statistics; and (c) those at the "advanced" level should be understood by average readers who have passed two typical graduate courses in statistics and at least one advanced course in statistics. Each member could label the unfamiliar techniques as level 4, and could also list additional statistical techniques along with their corresponding sophistication levels.

The median sophistication level of each technique was used as its sophistication level. Operationally, the highest level among all techniques reported in an article was defined as its level of statistical sophistication of research.

A .90 reliability coefficient of the instrument was calculated by using the test-retest procedure in a pilot study. The following formula was used in determining the reliability:

$$\frac{(\#\text{ of Coding Agreements} - \#\text{ of Coding Disagreements})}{(\#\text{ of Total Coding})}$$

Articles in the sample were analyzed and coded upon their availability to the researchers. If the same statistical technique was cited or used more than once in a single article, it was coded only once. An α level of .05 was used in inferential statistics in data analysis.

RESULTS

A total of 18 different statistical techniques was reported in the sample (Table 1). The most frequently used correlational-inferential techniques were identified as Pearson correlation (*n*=18), t-tests (*n*=16), and one-way ANOVA (*n*=11). About 98% of the sample articles reported at least one type of descriptive statistic, whereas 74% of the articles used at least one correlational-inferential statistical techniques. The number of correlational-inferential statistical techniques used per article ranged from 0 to 4, with the mean of 1.74 (*SD*=1.24).

Insert Table 1 about here

The reported techniques were further grouped into eight clusters (Table 2). The most frequently used techniques by clusters were found in "Descriptive" and "Correlations" whereas the least frequently used techniques by clusters were found in "Chi-square", "Regressions", and "Nonparametric".

Insert Table 2 about here

Among the articles examined, 58% (*n*=29) were classified as "basic" in the level of statistical sophistication of research, 28% (*n*=14) as "intermediate", and 14% (*n*=7) as "advanced" (Table 3). Nearly half (46%, *n*=23) of the sample articles focused on the problem area of "curriculum", whereas only 10% (*n*=5) of articles were on the area of "students". Furthermore, one-way analysis of variance on the statistical sophistication levels of research indicated that there were no significant differences among the studies in the four problem areas (*F* (3,46)=.80, *p*=.519) (Table 3).

Insert Table 3 about here

Statistical techniques in the eight clusters were further broken down by time periods (see Table 2). Slight differences were found in the frequencies and ranks of clusters between the two time periods. A Spearman rank-order correlation coefficient (ρ) of .976 indicated a very high degree of consistency in the relative frequencies of techniques used in the two time periods. In addition, averages of 1.76 (*SD*=1.30) and 1.72 (*SD*=1.21) correlational-inferential techniques per article were reported in the 1980-83 and 1986-89 periods, respectively. An independent t-test ($t(48)=.11$, $p=.91$) suggested that, on the average, a similar number of correlational-inferential techniques was used in one study in the early and late 1980s. Moreover, no significant changes occurred in the level of statistical sophistication of research in agricultural education research between the early and the late 1980s (χ^2 $(2, n=50)=.463$, $p=.79$) (see Table 4).

Insert Table 4 about here

CONCLUSIONS AND RECOMMENDATIONS

The findings of this study led to the following conclusions:

1. The level of statistical sophistication of research of a majority of studies in agricultural education in the 1980s was less than advanced;

2. The statistical sophistication of research did not change from the early 1980s (1980-83) to the late 1980s (1986-89) among studies in agricultural education;

3. The levels of statistical sophistication of research did not differ among the studies in various problem areas in agricultural education.

Practical implications of this research could be found in statistical preparation of agricultural education researchers. Those statistical techniques listed at "basic" and "intermediate" levels should be included in graduate programs so that the graduates can understand the statistical aspect of most research literature in agricultural education. The acquired expertise in statistics will be of practical value in at least ten years in the field of agricultural education.

The concept of statistical sophistication of research in this study is an indicator of the "statistical readability" of a research article. It is determined by the highest level of statistical sophistication among all the statistical techniques used in an article. However, all the related literature focused on examining the sophistication levels of statistical technique themselves. Due to this conceptual difference, it is difficult to compare the findings of this study with those previously reported.

A ten-year period might be too short to allow significant changes to occur in the application of statistical techniques in agricultural education. Another possibility is that the statistics training for researchers in the field has not changed significantly in last ten to twenty years. The change in the researcher's statistical competency is a prerequisite for any changes to occur in performing statistical analysis. Further studies are needed to access the statistical competency of researchers in agricultural education.

No assumption was made in this study that a high level of statistical sophistication equated appropriateness of the use of statistical techniques. However, agricultural education researchers should be aware of the availability of more sophisticated statistical techniques so that the most appropriate ones could be applied in research.

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Table 1

Frequencies and Ranks of the Statistical Techniques Used

Statistical Techniques	Frequency	Rank
Level 1: Basic		
Descriptive[a]	81	1
Pearson Correlation	18	2
t-tests	16	3
One-Way ANOVA	11	4
Chi-Square	6	6.5
Spearman rho Correlation	4	9
Kendall's Tau Correlation	2	13
Level 2: Intermediate		
Multiple Linear Regression	6	6.5
Post-hoc Multiple Comparisons	6	6.5
One-Way ANCOVA	3	10.5
Part/Partial Correlations	3	10.5
Kendall Concordance Coefficient	2	13
Kruskal-Wallis One-Way ANOVA	1	16.5
Other Correlations[b]	1	16.5
Level 3: Advanced		
Factor Analysis	6	6.5
One-Way MANOVA/MANCOVA	2	13
Path Analysis	1	16.5
Factorial MANOVA/MANCOVA	1	16.5

[a] Descriptive statistics included measure of central tendency, measures of variability, frequency, and percentage;

[b] Other Correlations included phi, rank biserial, point biserial, tetrachoric, biserial.

Table 2

Frequencies and Ranks of Statistical Techniques Used by Clusters in the 1980s

Clusters	1980s		1980-83		1986-89	
	Freq	Rank	Freq	Rank	Freq	Rank
Descriptive	81	1	36	1	45	1
Correlations[a]	30	2	16	2	14	2
t-tests	16	3	8	3	8	3
ANOVAs[b]	14	4	7	4	7	4
Multivariate[c]	10	5	5	5	5	5
Chi-square	6	6.5	4	6	2	7
Regression	6	6.5	2	7	4	6
Nonparametric[d]	1	8	1	8	0	8

[a] "Correlations" included Pearson r, Spearman rho, Kendall's tau, Kendall coefficient of concordance, part/partial correlation, and other correlations

[b] "ANOVAs" included one-way ANOVA and one-way ANCOVA.

[c] "Multivariate" included factor analysis, MANOVA/MANCOVAs, and path analysis.

[d] "Nonparametric" included Kruskal-Wallis one-way ANOVA

Note. post-hoc multiple comparisons were not included in any above categories because their use required the presence of ANOVAs.

Table 3

Cross Classification of Statistical Sophistication Levels (SSL) by Problem Areas Studied

Problem	Statistical Sophistication Level (n/%[a])			Total	SSL Mean/SD[b]
	Basic	Intermediate	Advanced		
Teacher	9/18	3/6	2/4	14/28	1.5/0.8
Student	3/6	1/2	1/2	5/10	1.6/0.9
Curriculum	11/22	8/16	4/8	23/46	1.7/0.8
Setting	6/12	2/4	0/0	8/16	1.3/0.7
Total	29	14	7	50/100	1.6/0.7

Note. *F*(3,46)-.80, *p*-.519

[a] The row percentage.

[b] SSL was based on: 1 - Basic; 2- Intermediate; and 3 - Advanced.

Table 4

Cross Classification of Statistical Sophistication Levels by the Two Time Periods

Period	Statistical Sophistication level (n/%[a])			Total
	Basic	Intermediate	Advanced	
1980-83	15/60	6/24	4/16	25/100
1986-89	14/56	8/32	3/12	25/100
Total	29	14	7	50/100

Note. $\chi^2(2, \underline{n}=50)=.463$. $\underline{p}=.79$

[a] The row percentage.

THE DETERMINATION OF STATISTICAL SOPHISTICATION OF RESEARCH IN AGRICULTURAL EDUCATION

A Critique

George Wardlow, University of Arkansas -- Discussant

This paper presents a good analysis of the types and levels of statistical techniques used in empirical-analytic based research published in the refereed journal of the Agricultural Education profession. This study provides the profession with a status report on one logical manifestation of its research abilities. As such, it is worthy for inclusion in the professional literature base.

The paper successfully uses relevant literature to provide an Introduction to the problem. This reviewer would have liked to have seen a further development of the "Goodwin and Goodwin system" used in the classification of the statistical procedures. The Purposes and Objectives were clearly stated. The Methods and Procedures were adequately conducted and explained. The Results were presented in a straight forward fashion using both statistical and narrative form. The Conclusions generally matched the Results as presented. A few questions and comments are presented herewith which may bear addressing.

Objective 3 sought to "determine the relationship between the statistical sophistication of research and the problem areas studied." The study addresses this objective by conducting one-way analyses of variance. However, the wording of the objective implies that some form of correlational analysis is to be performed. Conceptually, one wonders which is the most appropriate procedure to have performed.

As one reads the paper, one is left wondering of the practical implications to the profession. What were the motivations behind the conduct of the study? It determines that the statistical procedures used in the profession are "less than advanced." However, it concludes that "those statistical techniques listed at 'basic' and 'intermediate' levels should be included in graduate programs...." Why?

What assumptions were made by the researchers regarding what should be the nature of "research" in the profession? Is this study based on a biased assumption that only quantitative studies are worthy of the label "research" and that there is a hierarchy of worthiness even among them? It presents the precept that the statistical analyses employed by the researcher are "logically influenced by the nature of the research problem." One is left to wonder that if the nature of a research problem led to a research paradigm which did not include the quantification of data, would it even be pursued by researchers in Agricultural Education? Could it be pursued by most researchers in Agricultural Education?

These last comments are no reflection on the worthiness of the study in question, but address issues which are exemplified by this paper. They should not be a reflection on an other wise well-done paper.

While this study represents a component to a foundation for research about our research, it is the hope of this reviewer that the profession realize that valid and vital research can and should be conducted about Agricultural Education and by Agricultural Education researchers which utilizes other research paradigms. Further, the profession should not be so narrow to believe that only research on agricultural education can inform Agricultural Educators; indeed, we must investigate related professions to validate our own. It is unfortunate that we in Agricultural Education continue to reject research from the larger education profession for inclusion in our meetings and publications solely because it does not conform to historical stereotypes that our research must be specifically related to agricultural education and must be quantitative. If we do not allow research about larger vocational education issues or even general education issues (for example) into our professional deliberations, have we admitted that we are but a dispensable option to that larger profession?

DIFFERENCES IN ATTITUDES OF AGRICULTURAL EDUCATION AND OTHER VOCATIONAL EDUCATION COOPERATING TEACHERS REGARDING STUDENT TEACHING EXPECTATIONS

by

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DIFFERENCES IN ATTITUDES OF AGRICULTURAL EDUCATION AND OTHER VOCATIONAL EDUCATION COOPERATING TEACHERS REGARDING STUDENT TEACHING EXPECTATIONS

Many teacher educators consider the student teaching experience as one of the most critical elements in teacher education programs. Hauwiller, Abel, Ausel, and Sparapani (1988-89) refer to student teaching as the capstone of teacher training programs. The quality of the student teaching experience, because of its potential effect on preservice teachers, is a concern to the profession. Therefore, teacher educators have developed expectations for the student teaching experience that involve cooperating teachers, student teachers, and student teaching centers. However, even when expectations of a field-based teacher education program are outlined specifically, research has shown that the actual implementation of a program reflects a great deal of diversity (Goodman, 1983; Griffin, Barnes, Hughes, O'Neal, Edwards, & Defino, 1983; and Zeichner & Liston, 1985).

University expectations for the student teaching experience are based on accepted educational theory and practice. Research conducted by Kirts and Claycomb (1981) found specific requirements for student teachers and student teaching programs vary widely across vocational teacher education institutions, but many common elements and policies remain. In order to communicate expectations to cooperating teachers, most universities with teacher education programs develop and distribute handbooks or manuals containing expectations to their cooperating teachers (Martin & Yoder, 1985). In most instances the cooperating teachers were selected for their professionalism and the quality of their local program. Yet, university supervisors often return from student teacher supervisory visits with concerns regarding the supervision of student teachers (Martin & Yoder, 1985). Research conducted by Deeds, Flowers, and Arrington (1991) and Larke, Briers, and Norris (1991) concluded that teacher educators and cooperating teachers were in agreement regarding expectations of the student teaching experience. Why then, are there differences perceived between university expectations and cooperating teacher performance? These differences in expectations have led to calls for certification of cooperating teachers by some educators (Morris, Pannell, & Houston, 1984-85).

An explanation for these differences between expectation and performance may be the attitudes of the cooperating teachers toward university expectations. Cohen (1964) defines attitudes as precursors of behavior and as such attitudes may influence the way in which cooperating teachers approach the student teaching experience. In addition, the attitudes of cooperating teachers may reflect their personal experiences and concerns related to the supervision of student teachers (Horst & Des Jarlais, 1984). According to Boiarsky (1985), attitudes and behaviors of teachers can be influenced by feedback and coaching from university teacher education faculty. Henson (1987) suggested that attitude change can be enhanced by involving those affected by the change, developing a sense of "ownership" in the change, and providing support for the change in attitude or behavior. Therefore, it appears that teacher educators can influence attitudes of cooperating teachers.

University-developed student teacher handbooks and student teaching manuals, no doubt, assist cooperating teachers in carrying out these general roles by providing more specific instructions and activities to be completed by student teachers. However, cooperating teachers may have had little input in the development of student teaching expectations, policies, and procedures. Hauwiller, et. al (1988-89) suggested that little effort has been directed toward forging connections between teacher education programs at universities and public schools. In a national study of secondary agriculture teachers, Lelle and Kotrlik (1987) found that vocational agriculture teachers felt they had little opportunity for input in agricultural teacher education policies.

PURPOSE AND OBJECTIVES

If attitudes are precursors of behavior and the attitudes of cooperating teachers influence student teachers, it is important to determine the attitudes of cooperating teachers toward student teaching. The first use of these data would be to identify the areas of conflict between teacher attitudes and university expectations. In addition, in order to provide information for agricultural teacher educators it is important to determine if agricultural education cooperating teachers have different attitudes toward student teaching expectations than other vocational education cooperating teachers. This knowledge would provide a basis for evaluating university expectations and/or providing inservice activities that would attempt to influence the attitudes of cooperating teachers.

As teacher education continues the current reorganization process, adjustments in student teaching programs may be mandated by accrediting agencies, and additional changes may be required. Input from the cooperating teachers could prove valuable in changing procedures and programs to meet new standards.

The specific objectives of this study were:

1. To determine the attitudes of vocational education cooperating teachers in North Carolina regarding university expectations for cooperating teachers and the student teaching experience.

2. To determine if agricultural education cooperating teachers held different attitudes toward university expectations for the student teaching experience than cooperating teachers in other vocational education areas.

PROCEDURES

The population of the study consisted of all vocational education teachers in North Carolina (N = 296) who had served as cooperating teachers for the universities in the University of North Carolina System within the previous five years and were still teaching. Teacher educators at each institution were contacted and asked to provide lists of cooperating teachers for their university. Two universities did not provide cooperating teacher lists and were not included in this study. Therefore, the accessible population involved eight of the ten universities in the University of North Carolina System with vocational teacher education programs (University of North Carolina, 1989). Proportional random sampling techniques were employed in order to assure that all vocational program areas were represented and to control for sampling error. According to Krejcie and Morgan (1970) a sample size of 167 was required in order to assure a 5% degree of accuracy and a 95% confidence level. The sample was surveyed during the Spring Semester by the use of a mailed instrument. Nonrespondents received a mailed reminder approximately two weeks following the established deadline for returning instruments. Usable responses were received from 120 cooperating teachers for a response rate of 71.8%. Nonresponse error was controlled by statistically comparing early respondents to late respondents, and no differences were found for any of the four subscales on the instrument. Therefore, the respondents were judged to be representative of the sample and the data were combined for analysis.

The instrument used in this study was developed by Deeds, Flowers, and Arrington (1991) and was used in an earlier study involving agricultural education cooperating teachers. Only minor changes in the wording of the items to reflect vocational education terms were required. The original instrument was developed using student teaching expectations from selected vocational teacher education programs. Items included in student teaching handbooks, manuals, or printed policies were assumed by the researchers to represent university expectations for the student teaching experience. The instrument consisted of five demographic items and 31 items related to university expectations of the student teaching experience. A four-point Likert-type scale ranging from Strongly Agree to Strongly Disagree was used.

Content validity of the instrument was established by vocational education faculties at four universities with vocational teacher education programs. The 31 attitude items included four subscales with the following coefficients of internal consistency (Cronbach's Alpha): (a) role of the cooperating teacher = .63; (b) responsibilities of the student teacher = .68; (c) professionalism = .72; and (d) program components = .70.

Descriptive statistics, including frequencies of responses, percentages, and measures of central tendency and measures of variance were used to summarize the data. Differences between agricultural education cooperating teachers and other vocational education cooperating teachers were examined using t-tests. In order to control for experiment-wise error resulting from multiple t-tests, an alpha level of .01 was established a priori.

RESULTS

The agricultural education cooperating teachers in this study had been teaching an average of 20.5 years, compared to 17.5 years for the other vocational education cooperating teachers. Masters degrees or above were held by 65% of the agricultural education cooperating teachers and 54% of the vocational education cooperating teachers. The agricultural education cooperating teachers had supervised an average of 2.45 student teachers during the past five years, while the other vocational education cooperating teachers in this study had supervised an average of 2.20 student teachers over the same time period. The agricultural education cooperating teachers supervised an average of seven student teachers during their career, compared to five for the other vocational education teachers.

The data indicated that both groups of cooperating teachers tended to agree with most of the university expectations for student teaching. Twelve items in Part I of the instrument dealt with the role of the cooperating teacher. The cooperating teachers expressed lower levels of agreement in this area than for the other subscales. The highest rated item in this subscale was "Cooperating teachers should be on the school grounds when the student teacher is teaching" (See Table 1). Both groups of cooperating teachers also felt that they should maintain a teaching calendar to assist student teachers in planning. The areas in which some disagreement with university expectations was found were often items upon which agricultural education and the other vocational education cooperating teachers differed statistically. The agriculture teachers agreed ($\underline{M} = 3.25$), but other vocational teachers disagreed ($\underline{M} = 2.61$), that student teachers should be provided written evaluations weekly ($\underline{t} = 3.27$, $\underline{p} = .001$). Another difference ($\underline{t} = 3.90$, $\underline{p} < .001$) between the groups was found related to student teachers working independently as youth organization advisors, with agriculture teachers agreeing ($\underline{M} = 3.26$) and other vocational teachers disagreeing ($\underline{M} = 2.61$) with this expectation. Neither group of cooperating teachers felt student teachers should be observed each day they taught classes.

The subscale involving the responsibilities of student teachers consisted of the six items shown on Table 2. The mean scores presented in Table 2 indicate that cooperating teachers tended to agree with university expectations involving student teacher responsibilities. The responses of agricultural education cooperating teachers did not differ statistically from the other vocational teachers on any of the items in this subscale. Both groups of cooperating teachers felt it was important for student teachers to dress professionally, to have written lesson plans for classroom and laboratory activities, and to participate in all of the activities conducted by the cooperating teachers. Less agreement among cooperating teachers was found for having written teaching plans completed at least one week in advance of teaching. In general, the cooperating teachers did not believe that student teachers should be required to live in the community in which they are student teaching.

Table 1

Attitudes Toward the Role of the Cooperating Teacher in the Student Teaching Experience

Item	Ag Ed teachers (n = 20)		Other voc. ed. teachers (n = 100)		
	M	SD	M	SD	t
Cooperating teachers should be on the school grounds when the student teacher is teaching.	3.80	0.41	3.63	0.56	1.28
Cooperating teachers should make every effort to maintain their teaching calendar so student teachers can teach prepared plans.	3.45	0.51	3.45	0.50	0.01
Cooperating teachers should observe and evaluate student teachers along with the university supervisor during his/her visit.	3.15	0.88	3.18	0.81	0.16
Cooperating teachers should not be free to leave the school grounds when the student teacher is in charge.	2.95	0.83	3.18	0.77	1.20
Cooperating teachers should handle major discipline problems.	3.30	0.66	3.00	0.73	1.70
Cooperating teachers should review every teaching plan before the student teacher uses the plan.	2.75	0.72	3.04	0.78	1.54
Student teachers should be provided with instructional units to be taught the term or semester before student teaching.	3.15	0.67	2.95	0.79	1.06
Cooperating teachers should complete written evaluations of student teachers at least once per week.	3.25	0.72	2.61	0.82	3.27*
Cooperating teachers should give student teachers the opportunity to perform independently as youth organization advisors.	3.26	0.45	2.61	0.70	3.90*
Cooperating teachers should observe the student teachers' teaching performance each day.	2.60	0.88	2.71	0.98	0.45
Cooperating teachers should be responsible for providing university required experiences if not routinely available.	3.00	0.81	2.51	0.75	2.51
Cooperating teachers should be responsible for finding housing for student teachers, if necessary.	2.75	0.64	1.36	0.50	10.77*

Note. 4 = Strongly Agree; 3 = Agree; 2 = Disagree; 1 = Strongly Disagree.
* $p < .01$

Table 2

Cooperating Teachers' Attitudes Toward Student Teacher Responsibilities

Item	Ag Ed teachers (n = 20)		Other voc. ed. teachers (n = 100)		
	M	SD	M	SD	t
Student teachers should be required to dress professionally while student teaching.	3.65	0.49	3.74	0.44	0.79
Student teachers should have written teaching plans for every classroom session they are responsible for teaching.	3.40	0.68	3.58	0.54	1.28
Student teachers should have written teaching plans for every laboratory session they are responsible for teaching.	3.35	0.67	3.52	0.60	1.11
Student teachers should be required to participate in all the activities participated in by the cooperating teacher.	3.30	0.80	3.31	0.68	0.02
Student teachers should have written teaching plans completed at least one week in advance of teaching.	2.70	0.66	3.10	0.79	2.13
Student teachers should be required to live in the community in which they are student teaching.	2.10	0.85	1.92	0.71	1.00

Note. 4 = Strongly Agree; 3 = Agree; 2 = Disagree; 1 = Strongly Disagree.

The eight items included in the "program components" subscale are shown on Table 3. The cooperating teachers reported agreement with university expectations for five of the eight items in this section. The highest level of agreement with university expectations in this area among the cooperating teachers was for "safe, adequate, and properly maintained laboratory facilities". Other items in this area with which cooperating teachers tended to agree were "having written policies for their vocational program", "assigning student teachers to programs that matched their area of specialization", and "having chartered youth organizations with written policies. It should be noted that the agricultural education cooperating teachers expressed significantly higher levels of agreement than the other vocational education cooperating teachers with the need to have a chartered youth organization. The agriculture teachers agreed with the need for functioning advisory committees (M = 3.25), while the other vocational teachers did not feel advisory committees should be part of the criteria for selecting student teaching centers (M = 2.78). Both groups felt adult education programs should not be required for student teaching centers.

Table 3

Cooperating Teacher Attitudes Toward Student Teaching Center Program Components

Item	Ag Ed teachers (n = 20)		Other voc. ed. teachers (n = 100)		
	M	SD	M	SD	t
Cooperating schools should have laboratory facilities that are safe, adequate, and properly maintained.	3.85	0.37	3.66	0.48	1.69
Cooperating teachers should have written policies and standards for their vocational programs.	3.55	0.51	3.39	0.57	1.17
Student teachers should be assigned to a site matched to their needs and areas of specialization.	3.20	0.62	3.43	0.56	1.65
Cooperating teachers should have written policies for vocational youth organizations.	3.50	0.51	3.29	0.63	1.39
Cooperating schools programs should have chartered youth organizations.	3.75	0.44	3.22	0.69	3.29*
Cooperating schools should have functioning advisory committees.	3.25	0.55	2.78	0.66	2.98*
Cooperating teachers should be on extended employment contracts.	2.30	1.03	2.03	0.83	1.27
Cooperating schools should be required to have adult education programs in place.	1.90	0.55	1.77	0.71	0.77

Note. 4 = Strongly Agree; 3 = Agree; 2 = Disagree; 1 = Strongly Disagree.
* $p < .01$

Cooperating teachers expressed the highest levels of agreement for those items included on the "professionalism" subscale (see Table 4). Cooperating teachers tended to agree with four of the five items on this subscale. The strongest level of agreement was for "Cooperating teachers demonstrating an appropriate dress example." The agriculture cooperating teachers expressed significantly stronger agreement than their vocational counterparts that "Cooperating teachers should be members of professional organizations ($t = 4.54$, $p < .001$) and that they should be expected to "demonstrate professional growth by participating in programs outside of their district" ($t = 4.05$, $p < .001$). The other vocational education cooperating teachers disagreed more strongly than agricultural education cooperating teachers that "cooperating teachers should hold the master's degree or above" ($t = 3.36$, $p < .001$)

Table 4

Attitudes Toward Characteristics of Professionalism Needed to Serve as Cooperating Teachers

Item	Ag Ed teachers (n = 20)		Other voc. ed. teachers (n = 100)		
	M	SD	M	SD	t
Cooperating teachers should demonstrate an appropriate dress example for the student teacher.	3.70	0.47	3.68	0.47	0.17
Cooperating teachers should be members of appropriate professional organizations.	3.80	0.41	3.04	0.72	4.54*
Cooperating teachers should have demonstrated professional growth through participation in other than district sponsored programs.	3.70	0.47	3.00	0.74	4.05*
Student teachers and cooperating teachers should both be present during discussions following observations by university supervisors.	2.95	0.76	3.05	0.84	0.50
Cooperating teachers should hold the masters degree or above.	2.75	0.91	2.08	0.79	3.36*

Note. 4 = Strongly Agree; 3 = Agree; 2 = Disagree; 1 = Strongly Disagree. * $p < .01$

DISCUSSION

Both groups of cooperating teachers in North Carolina generally agreed with the expectations of the universities for the student teaching experience. The cooperating teachers were in strongest agreement with teacher educators on the items related to student teacher responsibilities and professionalism. Even though there was considerable agreement among cooperating teachers concerning university expectations, the fact that several of the cooperating teachers disagreed with some expectations was a concern and provided a basis for discussion. Teacher educators should do a better job of communicating expectations and the underlying rationale in workshops provided to the cooperating teachers.

As might be expected, the items related to the expectations for cooperating teachers tended to receive lower levels of agreement among the cooperating teachers. Responses of the cooperating teachers indicated that they felt less supervision of student teachers was needed than did teacher educators. When almost 50% of the cooperating teachers disagreed that they should observe the student teacher every day, perhaps teacher educators should be concerned about the quantity and quality of supervision provided to student teachers. This is pointed out by a substantial percentage (25%) of cooperating teachers who did not feel it was important to review lesson plans of student teachers prior to the lesson being taught.

The differences in attitudes between the agricultural education cooperating teachers and their vocational counterparts were most often found in the areas traditionally held as important to agricultural education -- working with youth organizations and advisory committees and participating in activities of professional organizations. Agricultural teacher educators should be encouraged that the cooperating teachers with whom they work placed a stronger emphasis on providing written feedback to the student teachers they supervise.

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DIFFERENCES IN ATTITUDES OF AGRICULTURAL EDUCATION AND OTHER VOCATIONAL EDUCATION COOPERATING TEACHERS REGARDING STUDENT TEACHING EXPECTATIONS

A Critique

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The unique role of agricultural education remains the preparation of public school teachers of agriculture. And a critical component of that preparation is student teaching. So, it is appropriate that we in teacher education in agriculture should examine the student teaching experience--its requirements, key players, history, and tenets. The review of literature for this study provides a good background in these areas. The review sets the stage for the research reported here.

The comparison of agricultural education cooperating teachers with cooperating teachers in other vocational education areas is interesting. It allows us to examine where we are in agricultural education in relation to our close kinfolks. Data collection procedures were direct and simple. The use of Krejie and Morgan procedures to determine sample size has become a kind of standard in our profession; however, I caution all of us to ensure that we employ those procedures carefully. For example, the author determined that a sample size of 167 was adequate. But, because the overall sample was analyzed as two distinct groups (agricultural educators and other vocational educators), then a more nearly correct procedure would have been to determine the sample size necessary to be representative of each of the two groups.

The researcher used an instrument designed and validated in previous research. I applaud him for this process and for the progammatic nature of his research in general. Certainly, I would go to him and his colleagues if I had a question about student teaching in agricultural education. The attitude section of the instrument was examined for internal consistency of each of its four scales. Each scale had acceptable internal consistency. Perhaps the author should have examined overall scale means as well as individual item means. Also, in the comparisons, all t-values were reported as positives. An examination of the means, however, indicated that some were negative. While none of the negative t-values indicated statistically significant differences ($p<.01$), reporting them as negatives may have been instructive to some readers; certainly, that would have been the accurate thing to do.

The findings indicated that ag ed teachers were generally more in agreement with statements about the student teaching experience than were other voc ed teachers. Not surprisingly, ag ed teachers are more "in tune" with us in teacher education than are other voc ed teachers. Additionally, except for three statements, ag ed teachers fell on the "agreement" side of the response scale (>2.5). So, whether or not we are doing the right things, at least we're pretty much in agreement about what it is we're trying to do in student teaching! I believe the researcher is doing many of the right things in conducting this research as well.

EARLY FIELD EXPERIENCE REQUIREMENTS FOR PRE-SERVICE AGRICULTURAL EDUCATION MAJORS IN THE UNITED STATES

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EARLY FIELD EXPERIENCE REQUIREMENTS FOR PRE-SERVICE AGRICULTURAL EDUCATION MAJORS IN THE UNITED STATES

INTRODUCTION AND THEORETICAL FRAMEWORK

Field experience in education, as defined by Elliott (1978), "... is a teacher preparation experience that occurs away from the university classroom in a location that provides guided observation or interaction with either students or in-service personnel who are working with students" (p. 1). Early field-based experience is the experience which is separated from, and prior to, student teaching (McMillion and Hoover, 1971).

Three roles are generally agreed on for early field-based experiences offered by university teachers education programs: 1) To observe and practice teaching skills, 2) To participate in professional socialization and 3) To observe and learn management skills (Applegate and Lasley, 1986). In other words, to try on the role of the teacher.

Pre-student teaching experiences are not specifically mandated by National Council for the Accreditation of Teacher Education program standards. No minimum number of hours or specific experiences are a part of the standards. However, the standards do allude to early field experiences in Criterion 28. "Field-based and clinical experiences are sequenced to enable education students to develop the skills that will enable them to assume full responsibility for classroom instruction or other professional roles in schools." (NCATE, 1990 p.49).

McMillion and Hoover (1971) surveyed all institutions with programs of teacher education in agriculture and had an 80% response rate. They reported that 39 institutions required pre-student teaching experience and that six others obtained 90% participation on a voluntary basis. Of the 39 institutions that required early experiences, an average of less than seven days was required. The institutions that had 90% voluntary participation requested an average of 11 days and those nine institutions with 75-90% voluntary participation requested 9.4 days.

Boucher (1978) indicated that approximately three-fourths of the institutions in the North Central Association provided pre-student teaching experiences for majors in secondary education.

A later study done by Parmley and Newcomb (1980) on vocational teacher preparation found similar results for agriculture teacher preparation. The 15 agriculture teacher education institutions surveyed reported that 86.7% had early field experience and it was concentrated in the sophomore and junior years. Of the agricultural education departments, 69% required 1-5 days of early experience with an overall mean of 5.38 days. One pre-service student was placed in a vocational agriculture department in 53.8% of the institutions and 53.4% offered either one or two credit hours for the early experiences program. In 61%

of the institutions, early experience centers were selected by the teacher educator staff only, and in 63% of the cases, students were assigned to centers with regard to their preference, if possible. No visits by teacher education supervisors during early experience were reported by 93.3% of the institutions responding.

Ishler and Kay (1981) in their study of a random sample of 550 institutions, with a 43% response rate, indicated that the following experiences were specified by respondents as being part of the early field experience; 99% included observations, 97.8% tutoring, 94.8% writing reports of the experience, 91.3% non instructional tasks, 84.3% planning instruction and only 25% included professional meetings. Deeds (1985) reported similar activities and assignments for the early field experience program studied at The Ohio State University.

Isher and Kay's study indicated that less than half of the institutions required an orientation with the cooperating teachers.

The requirements for early field experiences in agriculture did not change appreciably from the McMillion and Hoover study in 1971 to the Parmley and Newcomb study in 1980. Have the requirements for the experience changed in light of educational reform and the changes noted in the role and mission of agricultural education departments (Herring, 1992)?

What are the assignments and activities required during early field experiences in agricultural education? What is the scope of the experience required? What requirements are early experience sites and cooperating teachers expected to meet? Are these early field experiences being supervised by university personnel, and if so, to what extent. These questions about the current status of early field experience in agricultural education were the basis of this study.

PURPOSES AND OBJECTIVES

The purpose of this study was to determine the scope and nature of early field experiences required of students in pre-service teacher education programs. The specific objectives for the study were as follows:

1. To determine the type and scope of early field experiences.
2. To determine what assignments or activities were required for a grade during early field experiences.
3. To determine the nature of the early field experience placements including site selection, timing, and credit earned.
4. To determine the type and scope of supervision during the early field experiences.

METHODOLOGY

Data for the study were collected using a researcher developed instrument in the Fall of 1992. Content validity of the instrument was determined by a panel of experts made up of agricultural education faculty and graduate students. The frame for the study was all 97 institutions listed in the AAAE Directory for 1992. The instruments were mailed with a cover letter and stamped return envelope to the agricultural education department heads indicated in the directory. Non-respondents were sent a follow up postcard after the September 18 return date. A second mailing of the instrument was completed in early October. All non-respondents were contacted by phone and asked to complete the instrument. Five institutions indicated they no longer had agricultural teacher education programs at their institution, making the final population 92 institutions.

The total response rate was 89 percent with 82 of the 92 institutions responding. The instrument consisted of 39 forced choice questions concerning field experience requirements and expectations as well as demographic information concerning the institutions. The nature of the instrument made the determination of a reliability coefficient inappropriate. Data were analyzed using SPSSpc.

FINDINGS

The responding institutions represented all of the AAAE regions. Southern region had the most respondents with 36 (43.4%) followed by central with 19 (22.9%), and western and eastern regions each with 14 (16.9%) responding institutions. A majority of the respondents (58 or 69.9%) indicated they were located in a college of agriculture. The next most common location was the college of education with 15 (18.1%) followed by joint appointments in five (6.0%) institutions and the same number reporting their location as other than those listed.

The responding institutions indicated an average of 2.4 faculty supervising field experiences with a range of 1 to 10. A majority of the institutions had 1 or 2 faculty members supervising. (Table 1)

Graduate students were not used to supervise field experiences in 68 (82.9%) of the responding institutions. Six (7.3%) institutions used one graduate student supervisor, 4 (4.9%) used two, 3 (3.7%) used three and one institution used four.

Table 1

Number of Faculty Members Involved in Field Experience Supervision

Number of Faculty Members	Frequency	Percentage
1 - 2	51	61.4
3 - 4	23	27.8
5 - 6	7	8.4
7 - 8	1	1.2
9 - 10	1	1.2
Total	83	100.0

Over 75% of the responding institutions had less than 50 teaching agriculture education majors in their department. The number of students enrolled in a teaching agricultural education degree ranged from 1 to 145 students. The mean number was 36.5. Table 2 indicates that two schools reported 100 or more students in the teaching degree option.

Table 2

Number of Non-Teaching Agricultural Education Majors

Number of Majors	Institutions	Percentage
1 - 25	21	70.0
26 - 50	5	16.7
51 - 100	0	00.0
101 - 200	3	10.0
201 - 300	1	3.3
Total	30	100.0

Early field experiences prior to student teaching were required by 94% or all but five of the of the 83 departments responding to the study. The type and scope of the experience varied greatly. It was evident that many pre-service agricultural education majors have more than one early field experience. Fifty-two respondents indicated that early field experience was a separate class, 52% indicated the class was in agricultural education, 34% in education and 14% in both. The separate agricultural education received 2.1 mean credit hours (based on semester hours) with a range of 1 to 5 with the mode being 2. Education courses for early field experience earned a mean 2.7 credit hours with a range of 1 to 9 and mode of 3.

Early field experiences was reported as being part of another class by 42 (55.3%) respondents. Eleven also reported the courses were in agricultural education or education with 17 indicating that the experience was part of classes in both areas.

The number of clock hours of early experience required varied from 3 to 336. The overall mean number of hours was 56 with a mode of 45. Hours in agricultural education classes ranged from 3 to 300 with a mean of 35 and in education a range of 2 to 99 with a mean of 18. When asked how the number of hours of early field experience has changed in the last 10 years 38 (52.8%) indicated that it had increased with one respondent indicating a decrease.

Early field experience was commonly reported as being completed any time prior to student teaching (34) with 24 indicating the experience was planned for the sophomore year. Departments reported variety in the time of year of the experience with 49 (62.8) indicating that the experience was completed during the regular academic year. Thirty-one (40.3%) respondents indicated the student could complete the experience in a combination of the regular academic year and the summer. Five indicated they could complete the experience in the summer alone.

The methods used to assign the early field experience sites were fairly equally divided. Students selecting from an approved list was used by 24 respondents, 22 indicated that faculty members made the assignment and 21 indicated students were free to select a site. Other methods or a combination of the above were used by 11 of the responding departments. Students were allowed to complete their early field experience at their home high school at 27 (36%) of the responding institutions, 48 (69%) indicated they were not. Several institutions indicated that they did not forbid students to return to their home high school but it was strongly discouraged.

The most common assignments or activities for a grade in early field experience were to "observe agriculture teaching" 93.7%, "keep a diary of experiences" 83.3% and "participate in FFA activities" 64.1% (Table 3). Those assignment or activities required by less than 30% of the responding schools were "participate in professional organization or in-service," "give a demonstration," and "participate in adult education." Other assignments reported were writing reports of assignments, participating in 4-H or other youth activities, participating in FFA contests, meeting with school administrators or counselors, and meeting with the advisory committee.

Table 3
Early Field Experience Assignments/Activities Required For Grade

Assignment/Activity	Number	Percentage
Observe Agriculture Teaching	77	93.7
Keep a Diary of Experience	65	83.3
Participate in FFA Activities	50	64.1
Observe Teaching in Other Disciplines	44	56.4
Teach a Class	37	47.4
Participate in SAE Supervision	34	43.6
Participate in Other School Activities	27	34.6
Participate in Prof. Organization/In-service	23	29.5
Give a Demonstration	21	26.9
Participate in Adult Education	12	15.4

Cooperating teachers for early field experience were not required to meet special requirements by 44 (56.4%) of the responding departments. Of the 34 that had special requirements, 14 required a bachelors degree and 11 required a masters degree. They required a mean of 3.7 years of teaching and a mean of 2.5 years in the current school. Completing special training and being a member of the teachers professional organization was required by 16 respondents and 15 required that they be approved for use as a student teaching site.

The early field experience was supervised by university personnel in 26 (33.8%) of the responding institutions with a mean of 2.4 visits. Several respondents indicated that their agricultural education field experience was not supervised. The part of early field experience offered through education was more frequently supervised or part of an on site seminar.

CONCLUSIONS AND RECOMMENDATIONS

The findings of the study indicate that number of credits awarded for agricultural education early field experiences has not changed. Although a majority of the departments indicated the number of hours of early field experience had increased in the last 10 years in comparisons to earlier studies, (McMillion and Hoover, 1971 and Parmley and Newcomb, 1980) the increase has only been one or two days. The previous studies did not address the field experiences outside of the agricultural education department so the increase may be perceived as coming from the required professional education classes.

The timing of the experience has not changed, most of the departments are still requiring the experience during the sophomore or junior year. The methods used to assign students to cooperating school sites indicates that, in comparison to the Parmley and Newcomb (1980) study, students are more likely to be involved in the assignment process.

The activities and assignments were more agriculture education program specific than those reported in the earlier studies, including FFA and supervised agricultural experience program. Less than half of the students were required to teach or do demonstrations, making the early field experience in agriculture education an observation type of experience.

Cooperating teachers were not required to meet special requirements to work with early field experience students. Those departments that did have special requirements had lower expectations than they did for cooperating teachers in the student teaching program. Less than 20% of the departments that had early field experience required cooperating teachers to be a member of the teacher's professional organization.

The early field experience in agricultural education was not supervised by university personnel in nearly two-thirds of the institutions. The experience is monitored through the assignments students submit as a part of the experience.

The early field experience is relatively unchanged in the last 20 years. Teacher educators need to review the experience and determine if it is still serving the functions for which it was intended. The lack of information on some instruments made it clear to the researcher that some teacher educators were unaware of the scope and type of experience students were getting in their professional education classes, outside of the agricultural education department. Agriculture teacher educators need to be aware of the full range of field experiences their students are receiving in order to make sure the experiences are appropriately sequenced to meet NCATE requirements.

As a result of these conclusions, the researcher is somewhat concerned about student placement and supervision. Teacher educators often select teachers and sites for field experiences that they would want students to emulate. Yet, for early field experience, relatively few departments have formal requirements teachers have to meet. It is of specific concern that so few departments required cooperating teachers to belong to their professional organization. Teacher educators need to be more concerned about the influence of the cooperating teacher in the early field experience. Each department should have some minimum standards for teacher qualifications and characteristics, including years of experience and professional organization membership.

Suggestion for further research would include the following:

1. Collect information from departments on more specific assignments and activities in the early field experience. What depth of participation is required on

some activities? For example, on FFA participation, should they just observe an FFA meeting or should they serve as advisor or train a team?

2. Determine how early field experiences are evaluated and how agricultural teacher educators use those experiences in later instruction.

3. Determine the nature and scope of other early field experiences required in professional education courses outside the agricultural education departments and where the experience in agricultural education fits into the overall program.

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EARLY FIELD EXPERIENCE REQUIREMENTS FOR PRE-SERVICE AGRICULTURAL EDUCATION MAJORS IN THE UNITED STATES

A Critique

Gary E. Briers, Texas A&M University--Discussant

Findings from this study would be most useful for a program of teacher education in agriculture that wished to follow along or design its pre-service, early experience component to "match" in some ways its professional peers. That is, from this study, we are provided an excellent description of the status of early experiences. The author provides in the introduction a good history of early experience activities in agricultural education. She labels her introductory remarks as "theoretical framework." However, because there simply is not much theoretical work done in the area of professional preparation--at least not to my knowledge--there is no theory provided here. Rather, the introduction is historical: a historical account of previous surveys of early experience activities in teacher education in agriculture.

The lack of a theory base for the activity (early experience) makes for a difficult situation in terms of attempting to design a research study of that activity. Thus, the research design is strictly status descriptive. The purpose and objectives are straightforward--purely descriptive. The methodology is correspondingly simple--a census of programs of teacher education in agriculture. Most programs chose to respond (89%). So, the findings are representative of the current status of early experiences in teacher education in agriculture.

Now, how do those valid, reliable findings contribute to theory and/or to practice? Obviously, they do not add to theory--and that was not the purpose of this study. So, how do they add to practice? Well, I suppose that one could "follow the masses" and do what a majority of programs do. Or, perhaps one could "take the high road" and attempt to design early experiences around what the "better" or "best" programs do. However, without a theoretical base supporting what should be, how do we know which is the high road? One recommendation by the author sums up best my thoughts about early experience: "Teacher educators need to review the experience and determine if it is still serving the functions for which it was intended." I would go further to recommend that, first, we must review whether or not the functions intended are of any value: to observe, to practice, to socialize professionally, to learn management skills. As the author clearly stated, not even the National Council for the Accreditation of Teacher Education mandates early field experience.

So, the larger question unanswered by this research is this: Is the preparation of teachers improved by early field experience? I believe that the jury is still out on that most fundamental question. I encourage the author to answer that question as a necessary step before recommending procedures for the practice of early field experience in programs of teacher education in agriculture.

THE EFFECTIVENESS OF COMPUTER ASSISTED INSTRUCTION IN A HORTICULTURE PLANT IDENTIFICATION CLASS

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INTRODUCTION AND THEORETICAL FRAMEWORK

The computer is a tool used to supplement instruction and teach students. Bork (1985) stated that computers will become a dominant educational technique before the end of the twentieth century. Purchases of computers for classroom use increased dramatically within the last decade (Becker & Shoup, 1985; Bork, 1985; Drazdowski, 1990; Schaad & Edfeldt, 1989). This growth suggested that computers are becoming a common educational tool in today's classroom.

Computer-assisted instruction (CAI) increased the instructional value of the computer. Several researachers found that CAI successfully presented new information to students in a self-contained and self-paced system (Hannafin & Peck, 1988). The computer can be programmed to operate at the students' levels and to adapt to their needs to provide individualized instruction (McKeachie, 1986).

Computers have been used in simulation, drill and practice, testing, tutorial, and many other instructional situations (Arons, 1984; Becker & Shoup, 1985; Bourque & Carlson, 1987; Fine, et al., 1991). These researchers reported positive results from CAI while Bowen and Agnew (1986), Rohrbach and Stewart (1986) and others have reported negative or no significant differences for students using CAI and students using traditional learning methods. Miller and Foster (1985), Henderson (1985), and Birkenholz, et al., (1989) recommended research to determine the efficiency of CAI in agricultural education.

PURPOSE AND OBJECTIVES

In 1991, the Department of Horticultural Sciences at Texas A&M University introduced CAI into a landscape design class and a plant identification class. The question addressed by educators was, "Can computers, and more specifically the Plant Stax™ plant identification program, effectively teach students plant identification?"

The proposed research project involved evaluating the effectiveness of CAI in a collegiate horticulture plant identification course. As compared to students' learning to identify plants by seeing, touching, and sometimes smelling and tasting live plant material. In past research, most course topics taught using CAI were more abstract than that of plant identification. Therefore, studying the effect of CAI in a plant identification class was of interest to help define the subject areas in which CAI is a successful instructional technology.

The purpose of the study was to determine the effectiveness of CAI in a horticulture plant identification course. Specific objectives to accomplish this purpose were to:

1. compare cognitive knowledge gained among treatment groups, and
2. compare attitudes toward computers among treatment groups.

METHODS AND PROCEDURES

This study was conducted using a pre-test/post-test non-equivalent control group quasi-experimental design. The design consisted of two treatment groups and a control group (Table 1). This allowed for differential effects between the treatment groups and the control group to be identified.

Forty-three upper-level undergraduate students at Texas A&M University were involved in the study. These students were enrolled in the 1991 fall semester course Horticulture 207 "Woody Ornamental Plants."

Table 1 Design of the Project. N = 43

GROUP A Control n = 17	GROUP B Treatment n = 15	GROUP C Treatment n = 11
pre-test	pre-test	pre-test
lecture class	lecture class	lecture class
Live plant laboratory only	CAI laboratory only	Both live and CAI laboratory
post-test	post-test	post-test
Computer Attitude Inventory	Computer Attitude Inventory	Computer Attitude Inventory

During a fifteen week semester all students were required to attend two one-hour lecture sessions and one two-hour laboratory session per week. During the lecture sessions, all students received the same plant identification material instructor-lecture, -discussion, and -slide presentations.

Selection of the laboratory section was part of class registration, and students were unaware of the different teaching treatments to be employed. Each laboratory section was randomly assigned a teaching treatment. In all treatments, students learned identification and cultural characteristics of a predetermined number of plants each week.

TREATMENT GROUP A. Students learned to identify plants via a traditional plant materials laboratory. The laboratory instructor met with the students to view and explain the plants. They viewed live plant specimens in their natural environment or in a greenhouse. Students in this treatment group were allowed to study the live specimens on their own time and schedule but were not provided instruction with the Plant Stax^{tm} program.

TREATMENT GROUP B. Students in this section learned to identify plant material via CAI. The laboratory instructor was available during the assigned time for technical instruction on both the use of the computer system and identification of plant materials. Students were allowed to study using live specimens and CAI on their own during open laboratory hours. No instruction was given outside of the CAI laboratory.

TREATMENT GROUP C. Students learned to identify plant material via live specimens and CAI. The laboratory instructor presented live specimens with instruction about identification of that plant. Cultural information was then presented by computer instruction. Students were allowed to use the computer program and view live specimens during scheduled laboratory hours and on their own for study.

A commercial software program was utilized for the CAI. Plant Stax™ was an Apple^{R} Macintosh™ plant identification and description software program built on the HyperCard™ version 2.0.2 platform. This program was developed to complement instruction in plant identification courses. The program consisted of a full page description of each plant and relevant graphics of that plant.

The instruments used to collect data were grouped into three parts: pre-test, post-test, and computer attitude inventory. The treatments and tests were administered during the 1991 fall semester course Horticulture 207 "Woody Ornamental Plants." As suggested by Isaac and Michael (1990), instruments were distributed and completed during the time of regularly scheduled examinations of the lecture session when all the students of the various treatments met as one class.

To assess the students' existing knowledge of plant identification, a pre-test was administered at the beginning of the course. The course instructor developed the test questions based on course objectives and the content consisted of common plant identification information.

Students were given a post-test to assess change in their knowledge of plant identification. The post-test consisted of the same nineteen questions used for the pre-test.

A computer attitude inventory was also given at the completion of the course to assess the students' attitudes about computers. The survey consisted of twenty-one questions developed by the researcher of this project and adapted from Morrison's (1983) survey. Students were asked to respond to statements using Likert-type responses. A panel of Agricultural Education experts reviewed the survey for content validity. Cronbach's coefficient alpha, a measure of internal consistency, was used to determine the reliability of a multi-item scale used for the attitude inventory, the coefficient obtained was .84.

Although normally used in sample studies, inferential statistics were used for results of a time, place sample of students who enrolled in the course. The use of inferential statistics in this study was not an attempt to generalize the findings to all courses using CAI. However, it may be suggested that future courses and students may have characteristics similar to those found in this study.

RESULTS AND FINDINGS

Cognitive Knowledge Gained

Overall, post-test scores were significantly higher than pre-test scores. The pre- and post-tests consisted of nineteen questions and the scores were calculated by the number of correct answers out of nineteen. Table 2 shows the means of pre-test and post-test scores for the class overall. The mean of the pre-test was 8.3 and the mean of the post-test was 14.07. In general, the total population had a positive learning experience. Students increased their ability to identify plants by the end of the course.

The amount of cognitive knowledge gained by the students was calculated by the difference in pre- and post-test scores (post-test score minus pre-test score). Upon completion of the course, the class overall had an average gain of 5.77 points (Table 2). This gain indicated a significant increase in knowledge since the beginning of the course.

Table 2 Pre-test, Post-test, and Cognitive Knowledge Gained Scores.

Variable	N	Mean	t-Value	Alpha
Pre-test	43	8.30	12.51	0.0001
Post-test	43	14.07		
Cognitive Knowledge Gained	43	5.77		

Attitudes Toward Computers

A computer attitude inventory was given at the completion of the course to assess the students' attitudes toward computers. The survey consisted of twenty-one questions, and the students were asked to respond using Likert-type responses. The five possible responses and coding scheme to each statement were "strongly disagree" (1), "disagree" (2), "don't know" (3), "agree" (4), and "strongly agree" (5).

An attitude score for each student was calculated by adding all twenty-one attitude responses, to obtain a raw total, and dividing by 21, to obtain a mean score representative of the Likert-type scale used.

Students in the class as a whole had an overall mean attitude score of 3.36 (Table 3). This score indicated that the class had a slightly positive attitude toward computers. The attitude scores for the students ranged from 2.19 to 4.24 with a standard deviation of 0.478. The broad range of attitudes held by the different students indicated that not all students had similar experiences or perceptions of computers.

Table 3 Students' Overall Mean Attitude Score.

	N	Mean	SD
Attitude Score	43	3.36	0.48

1 = strongly disagree, 2 = disagree, 3 = don't know, 4 = agree, 5 = strongly agree

Upon examination of the mean responses for the individual attitude statements, the range of responses for the survey statements was 4.53 ("I am amazed at what computers can do.") to 1.42 ("Computers can make important decisions better than people.").

Students most strongly agreed with the statements "I am amazed at what computers can do," (mean = 4.53); "Computers make it possible to speed up scientific progress and achievement," (mean = 4.37); and "Computers are important to my future" (mean = 4.16). Table 6 shows the mean attitude scores of selected statements from the attitude toward computers inventory. Generally students thought that computers were important to the future and powerful tools in the work force today.

The students most strongly disagreed with the computer attitude statements when computers were compared with human characteristics. The statements in which students most strongly disagreed were, "Computers can make important decisions better than people," (mean = 1.42); "Computers can think like human beings can think," (mean = 1.65); and "Computers make me feel that machines can be smarter than people" (mean = 2.02) (Table 6). These lower scores indicated students believed computers were learning tools not "thinking machines."

One statement included in the instrument was designed to determine the students' attitude of the use of computers in the plant identification course. The mean response to the statement, "Computers are helpful in learning material for Horticulture 207," was 3.14 (Table 4). This response indicated that the students only slightly agreed that computers aided them in learning the material covered in class.

Table 4 Selected Statements: Attitudes Toward Computers Inventory (N = 43)

Selected Computer Attitudes	Mean	SD
I am amazed at what computers can do.	4.53	0.91
Computers make it possible to speed up scientific progress and achievement.	4.37	0.76
Computers are important to my future.	4.16	0.78
Computers are helpful in learning material for Horticulture 207.	3.14	0.97
Computers make me feel that machines can be smarter than people.	2.02	1.01
Computers can think like human beings can think.	1.65	0.78
Computers can make important decisions better than people.	1.42	0.59

1 = strongly disagree, 2 = disagree, 3 = don't know, 4 = agree, 5 = strongly agree

Cognitive Gain by Treatment Group

When separated by treatment groups (plants only, CAI only, or plants and CAI), no treatment group was significantly different from the other groups in the amount of plant identification knowledge possessed at the beginning and end of the study (Table 5). Pre-test scores showed that the students were homogeneous in their knowledge of plant materials at the beginning of the course. On the pre-test, Treatment A, the plants only group, scored an average of 9.11 correct out of nineteen questions, Treatment B, the CAI only group, scored 7.93, and Treatment C, the plants and CAI group, scored 7.54. No significant difference in pre-test scores was found among treatment groups.

Table 5 ANOVA on Pre-test and Post-test Scores When Grouped by Laboratory Treatment.

	Treatment A (plants only)		Treatment B (CAI only)		Treatment C (plants & CAI)		F	F
	n	Mean	n	Mean	n	Mean	ratio	prob
Pre-test	17	9.11	15	7.93	11	7.54	1.09	0.34
Post-test	17	14.52	15	13.73	11	13.81	0.55	0.57
Cognitive Knowledge Gained	17	5.41	15	5.80	11	6.27	0.26	0.77

Post-test scores revealed that there was no significant difference between treatment groups in the amount of knowledge the students had at the end of the course. Treatment A, plants only, scored an average of 14.52 correct on the post-test, Treatment B, CAI only, scored 13.73, and Treatment C, plants and CAI, scored 13.81. No significant difference in post-test scores was found among the treatment groups. Table 5 reports the means of the pre- and post-test scores for each group. From these results, CAI was just as effective in teaching plant identification as the other teaching methods.

Attitudes of Computers by Treatment Groups

When separated by treatment groups (plants only, CAI only, or plants and CAI), no treatment group was significantly different from the other groups in their attitudes toward computers. Table 6 shows that the students in Treatment A, the plants only group, had a mean attitude score of 3.37, Treatment B, the CAI only group, had a mean of 3.28, and Treatment C, the plants and CAI group, had a mean of 3.45. It is important to note that the attitude inventory was administered after the treatment, yet no significant difference was found among the different treatment groups in their attitudes toward computers where it was thought that the groups using CAI would have had different attitudes toward computers.

Table 6 ANOVA on Attitudes Toward Computers Score When Grouped by Laboratory Treatment.

	Treatment A (plants only)		Treatment B (CAI only)		Treatment C (plants & CAI)		F ratio	F prob
	n	Mean	n	Mean	n	Mean		
Attitude Score	17	3.37	15	3.28	11	3.45	0.38	0.68

1 = strongly negative, 2 = negative, 3 = neutral, 4 = positive, 5 = strongly positive

It was also found that, among the treatment groups, there was no significant difference in the students' attitudes toward the use of computers in the Horticulture 207 course. When the responses to the statement "Computers are helpful in learning material for Horticulture 207" was examined, Treatment A (the plants only group) had a mean of 3.18, Treatment B (CAI only) mean of 3.20, and Treatment C (plants and CAI) mean of 3.00. Table 7 shows the mean attitude score for each of the treatment groups.

Table 7 ANOVA on Attitude Variable HORTCLAS* by Laboratory Treatment.

	Treatment A (plants only)		Treatment B (CAI only)		Treatment C (plants & CAI)		F ratio	F prob
	n	Mean	n	Mean	n	Mean		
HORTCLAS	17	3.18	15	3.20	11	3.00	0.15	0.86

*"Computers are helpful in learning material for Horticulture 207."

1 = strongly disagree, 2 = disagree, 3 = don't know, 4 = agree, 5 = strongly agree

CONCLUSIONS AND RECOMMENDATIONS

1. Students in the course had different attitudes about computers. This result supported the conclusion that a variety of teaching methods must be used to motivate and teach all students effectively.
2. While all students thought computers were "amazing machines" and they could be use to supplement instruction, it could not be overlooked that there was still a need for human teachers in the classrooms. Students did not think that computers could make better decisions, think, and be smarter than human beings.

3. In this study, there was no effect upon computer attitudes if students used computers for instruction in this course. No treatment group was significantly different in their attitudes toward computers.
4. The results of this study showed that it did not matter if the students used computers for instruction in this course. All of the teaching methods employed were shown to effectively teach students plant identification. Therefore, if an instructor can use computers to effectively supplement instruction, then the computer can become a valuable tool to the instructor. The instructor can use the computer to assist students as a study guide, provide make-up work, and demonstrate principles. Therefore, the instructor may save valuable time and effort in preparing lessons.

Based on the major findings and conclusions of this study, the following recommendations for practice are made for instruction using computer-assisted instruction:

1. Computers are being used for different applications in every aspect of life. There is now evidence of the usefulness of computers in education. Students can learn when computers are used to supplement instruction. Therefore, instructors should learn about computers and the applications of CAI and use this knowledge to their benefit. Using computers for instruction can help aid the teacher in more effective, teaching, lesson planning, and classroom management.
2. In this study, CAI was just as effective in teaching plant identification as other methods. Computer programs can be used for instruction. Therefore, development of new software is needed to provide similar technology and additional teaching methods for use in instructional situations.

The findings of this study led the researcher to propose the following recommendations for additional research:

1. Considering the small population used for this study, it is recommended that the study be repeated using a larger population. Findings from future research, using larger populations, will enable researchers to strengthen, or refute, the use of CAI.
2. Research efforts should continue using other horticultural courses and other courses within the field of agriculture. These studies will provide valuable information about new subject areas and how effective CAI can be to those instructional situations.
3. Future research about CAI should be conducted using up-to-date software. This research was conducted with a program in which the graphics were line drawings of the plants. There is now even newer computer technology that allows the student to view lifelike pictures of the plant specimen. Employing more life-like graphics may have a significant effect upon the success of CAI.

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THE EFFECTIVENESS OF COMPUTER ASSISTED INSTRUCTION IN A HORTICULTURE PLANT IDENTIFICATION CLASS

A Critique

Barbara M. Kirby, North Carolina State University

The introduction to the study establishes a framework from which to launch this study. As computer programs become more sophisticated, it is important for us to test their effectiveness in various educational settings. We can not assume that because students use computer aided instruction and fancy, expensive hardware that their instruction is necessarily better.

The purpose and objectives of the study were clearly stated. The researchers used an appropriate design for the intact lab classes. Using three groups strengthened the pretest post-test design. It would have been nice to have had more cases in each group, but we can't always have what we want in educational research. Obviously the reachers were sensitive to this as reflected in their recommendation to use larger groups. Some clarification is needed as to the explanation of the teaching treatments.

From the text, it appeared that Group A and Group B both used CAI and live plants and had laboratory instruction. Was outside lab instruction the difference in the two groups? Was the content of cultural information different for the two groups ? Table 1 leads the reader to believe that no plant lab instruction was provided for Group B. Also, it would be important to know if Group A had information, notes or a handbook, comparable to what was on Plant Stax. If they did, then we could say more about the actual effects of computerizing instruction.

The researchers did an excellent job of discussing their procedures and discussing and displaying their results. As a researcher who might duplicate this study, I would like to know more about the reliability and validity of the written test. The use of good scales for measurement is essential if one intends to meet underlying assumptions for the analysis of variance and report accurate F values. With regard to the test, I also wonder why there were only 19 items if students were learning plants for 15 weeks. Should there have been a live plant specimen test ?

The researchers drew sound conclusions and recommendations. I would like to see future research consider manipulating the use of live plants. Can students learn plant identification from Plant Stax or other programs and perform identification as well as students who use only live specimens? It would have been interesting for Group B to have had no interaction with live plants. Can the computer simulation be better than the "hands on" experience ?

Congratulations to the researchers for conducting a study that adds to our current base of computer technology research.

THE EFFECTS OF ELEVATED TEMPERATURES ON READING COMPREHENSION AND TASK COMPLETION TIME IN THE AGRICULTURAL EDUCATION LEARNING ENVIRONMENT

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THE EFFECTS OF ELEVATED TEMPERATURES ON READING COMPREHENSION AND TASK COMPLETION TIME IN THE AGRICULTURAL EDUCATION LEARNING ENVIRONMENT

INTRODUCTION AND THEORETICAL FRAMEWORK

Training in agricultural education is designed to provide students with hands-on learning opportunities, whether in the classroom or laboratory, to obtain a marketable occupational skill. Today's student can no longer be content to compete with his or her peers in a city, state, or even a nation but must compete with his or her peers in the world. Thus, the impact of a good education now transcends national boundaries and assumes international importance. In such an atmosphere, any change that will contribute to better education for students becomes important and deserves to be explored (National Commission on Excellence in Education, 1983).

One area of concern that deserves exploration is the thermal environment of secondary schools. Previous research has indicated that the thermal environment should provide an atmosphere in which students are unaware of any physical discomforts. They should neither be too warm nor too cold and the air movement should neither be too little nor too much (Rutgers, 1967). The thermal environment considerations involve maintaining a body temperature of 98.6°F in a way that does not require body heat exchange with the atmospheric environment. These conditions are air temperature, ideal 68-74°F, relative humidity, ideal 40-60%, and air movement, ideal 20-40 feet per minute (Sleeman and Rockwell, 1981). These environmental considerations have a significant impact on teaching and learning and comfort is a necessity for efficient teaching and learning (American Society of Heating, Refrigeration, and Air Conditioning Engineers, Inc., 1987).

Kevan and Howes (1980) noted that a positive relationship existed between the thermal environment of the classroom and learning. Sleeman and Rockwell (1981) stated that people prefer temperatures in the range of 68-75°F, but they are adaptable and can still perform reasonably well at temperatures up to 86°F, with a relative humidity of 80%. Hancock (1982) examined human mental and cognitive performance in conditions of elevated temperature. He concluded that mental and cognitive performance exhibited a decline as environmental temperature exceeded 85°F.

Peccolo (1962), in a study conducted at the University of Iowa, concluded that students taught in optimum thermal environmental conditions achieved more than students not taught in optimum thermal environmental conditions. "Educators have known for some time there is a correlation between comfort and learning" (Hansen, 1966, p. 2). McVey (1969) reported that educational tasks such as mental multiplications and problem solving showed impairment at 87°F. Harner (1973) concluded, through a review of research, that a significant reduction in reading comprehension occurred between the temperatures of 73.4°F and 80.6°F. McNall and Nevin (1967) reported that academic achievement was facilitated by thermal conditions in or near the comfort zone. Chan (1980) concluded that achievement in an air-conditioned school building was higher than in a non air-conditioned building.

Weaver (1990) indicated that there were approximately 5,958 school buildings in North Carolina with a total of 2,020 school buildings air-conditioned. This left 66% of the school buildings not air-conditioned. Yet, the mean number of days per year that the temperature is above 90°F in North Carolina is 42, which indicates that North Carolina is limited in summer school programs and an extended school year (National Climate Center, 1985).

PURPOSE AND OBJECTIVES

Research indicates that the thermal environment does have an effect on learning performance and task completion time of students. However, little or no research has been conducted in the field of agricultural education on the effects of elevated temperature on reading comprehension and task completion time. As societal conditions change, the need to acquire new knowledge will put greater demand on agricultural educators to provide learning opportunities for students to obtain marketable occupational skills. Therefore, the purpose of this study was to compare the effects of elevated temperature on student cognitive performance as measured by reading comprehension and time required for task completion in agricultural education classrooms. More specifically, the objectives of the study were:

1. To determine if reading comprehension performance of students is affected by increasing the temperature in the classroom environment from 68-74°F (comfort zone) to 90-95°F.
2. To determine if the amount of time required for students to complete a task is affected by increasing the temperature in the classroom environment from 68-74°F (comfort zone) to 90-95°F.

METHODS AND PROCEDURES

This study was conducted using a pretest treatment and a post-test quasi-experimental design in which the control group and the experimental group were nonequivalent. Campbell and Stanley (1963) stated that the nonequivalent control group design is used in educational research when the experimental and control groups both are given a pretest and a post-test, but there is no pre-experimental sampling equivalence among the control group and the experimental group.

The pretest and post-test quasi-experimental design and random assignment of the students to two treatment groups provided control to threats of external and internal validity such as history, maturation, testing, instrumentation, selection, and mortality. The population for this study consisted of all 1990-91 students enrolled in Agricultural Engineering Technology I courses from the 34 schools in North Carolina which offered a minimum of two classes of Agricultural Engineering Technology I as a part of their curricula during the 1990-91 academic year. North Carolina was divided into three geographic regions; mountain, central, and coastal because of the climatic differences found in the various regions of the State and two schools were randomly selected from each region to participate as test centers for the study. The six schools were randomly selected from the 34 schools in the population using a random sampling procedure recommended by Agresti and Finlay (1986). All students from each of Agricultural Engineering Technology I classes in the six schools served as part of the research sample. Classes were randomly assigned to either Group I (Control Group) or Group II (Experimental Group). Students from each group were chosen at random to participate in two equivalent reading tasks. The data were collected over a two-day period. During the pretest treatment half of each group received reading task "A" and the other half in each group received reading task "B". The second day of testing at the schools was the post-test experiment, with Group I being subjected to a classroom temperature at 68-74°F and Group II being subjected to a classroom temperature of 90-95°F. Students in each group who completed reading task "A" as a pretest treatment completed reading task "B" as a post-test experiment. Students in each group who completed reading task "B" as a pretest treatment completed reading task "A" as a post-test experiment.

The experiment required that the students be subjected to classroom environmental conditions for a period of 45 minutes. The first 25 minutes were used for class business, as an acclimation period, and for research directions. The first five minutes of the class periods were used by the instructor for class business and roll call. The researcher read and recorded the classroom temperature and relative humidity during this five-minute interval. During the next 15-minute period the researcher showed the students agriculturally related films in which the subject content of the films was irrelevant to reading task "A" or reading task "B". The films were alternated with the pretest and post-test activities. The purpose of the films was to allow the students time in the classroom environment to become acclimated to the thermal conditions before being administered the reading tasks. During the five-minute period immediately following the films, the researcher gave instructions for filling out the data collection instrument answer sheets and instructed students how to complete reading tasks "A" and "B". Once students were instructed, reading task "A" or "B" was handed to each student face down in Groups I and II. At this point, the classroom temperature and relative humidity were recorded and students began working. The classroom temperature and relative humidity were recorded again when all students had finished the reading tasks.

Relevant extraneous variables were held constant for Groups I and II in an effort to maximize the effect of the experimental variables on the dependent variables. Administrative procedures were held constant, with the same instructions and reading tasks being administered by the researcher, checks were made prior to the study to determine that classroom temperature could be maintained at the desired levels, the quality of printed material was uniform, recording and scoring procedures were the same with reading comprehension data representing the percentage of correct answers received by the individuals on the reading tasks and task completion time data representing the amount of time it took each student to complete the various reading tasks, which was measured to the nearest second, and the schools were selected by randomization.

The data collection instruments for reading comprehension consisted of two equivalent reading tasks designed to measure student reading comprehension of shop project plans. An expert committee was used to determine the content validity of the reading tasks and the materials were field-tested with two classes of Agricultural Engineering Technology I students from a school which was not selected to participate in the research study. Based on an analysis of the data utilizing the Kuder-Richardson 20 technique, the reading tasks were reduced to 15 questions each and the Kuder-Richardson 20 values for the revised instruments were .88 for reading task "A" and .82 for reading task "B". The actual research data were also analyzed using Kuder-Richardson 20 and the results of the analyses were .91 for reading task "A" and .87 for reading task "B".

The thermal environment of the classrooms were monitored during the experiments by using three dry bulb thermometers and three humidistats. The three dry bulb thermometers were placed at desktop height and in the same temperature zone with the students. Three readings were taken during each class period, one at the beginning of the 15-minute film, one at the beginning of the reading task assignment, and one at the end of the reading task assignment. Air velocity in the classrooms was not measured but a small fan on low speed was placed in each classroom to ensure a uniform air flow. All other air flow was cut off from the classroom.

In establishing the temperature levels of this experiment, a review of previous research was used. The Council of Educational Facility Planners (1976) recommended that the classroom thermal environment be in the comfort zone, which is 68-75°F. Sleeman and Rockwell (1981) stated that people preferred temperatures in the range of 68-75°F because the body temperature of 98.6°F does not require heat exchange with the atmospheric environment. The American Society of Heating, Refrigeration, and Air Conditioning Engineers, Inc. (1987) recognized the comfort zone 68-74°F as a necessity for efficient teaching and learning. With respect to previous research, the comfort zone temperature used with Group I, the control group, for this research was set at 68-74°F. According to Provins and Bell (1960), human performance deteriorates significantly between 85°F and 90°F. McVey (1969) concluded that educational tasks were significantly impaired at 87°F. Holmberg and Wyon (1969) concluded that reading speed and comprehension of children deteriorated over 30% when classroom temperature was elevated from 78°F to 90°F. Again, with respect to previous research, the temperature used with Group II, the experimental group, for this research was set at 90-95°F.

Analysis of variance was used to analyze the data for this research. Agresti and Finlay (1986, p. 399) and Steel and Torrie (1980, p. 1867) stated that utilization of the analysis of variance technique requires three assumptions: (1) The assumption of normality, (2) Homogeneity of variance, and (3) Independent samples. Assumption 1 was met by selecting six schools at random from the 34 schools in North Carolina which offered a minimum of two classes of Agriculture Engineering Technology I as a part of their curricula during the 1990-91 academic year. Further, classes in each selected school were randomly assigned to either Group I (control group) or Group II (experimental group). Assumption 2 was met by conducting the Bartlett's test of homogeneity which revealed that the data were homogeneous. Assumption 3 was met by the random assignment of the classes to either Group I (control group) or Group II (experimental group).

RESULTS AND/OR FINDINGS

The research involved studying the effects of elevated temperatures on student performance. Six North Carolina high schools with two classes of Agricultural Engineering Technology I were chosen by random sampling procedures to serve as test centers for the study. Classes at each testing center were randomly assigned to either the Group I (control group) or Group II (experimental group). Students in the sample were enrolled in grades 10 through 12 with ages ranging from 15 to 18 years. There were six female and 124 male students included in the sample. Both the control and experimental groups were administered reading tasks as a pretest treatment with classroom temperatures at 68-74°F (comfort zone). The post-test required the control group to complete a reading task with a classroom temperature of 68-74°F (comfort zone), the same as they had during the pretest. The experimental group was required to complete their reading tasks in a classroom with a temperature ranging between 90 to 95°F. The reading comprehension pretest scores were compared using analysis of variance statistical procedures and no significant difference was found between the control and experimental groups, ($F = 1.55$, $p = .2683$). The task completion times pretest scores were also compared using analysis of variance statistical procedures and no significant differences were found between the groups ($F = 1.20$, $p = .3237$). Therefore, the groups were assumed to be equivalent in their academic abilities.

The hypothesis, "there is no significant difference between group mean scores on reading comprehension at classroom temperatures of 90-95oF and 68-74°F," was tested at the .05 alpha level. Data for analyzing the reading scores consisted of the percentage of correct answers made by each student on the reading tests. Analysis of variance was used to test the significance of difference among groups means reported in Table 1. The results of the analysis of variance are reported in Table 2. The obtained p value for the experimental study was 0.2720, which indicated that the treatment effect was not statistically significant at a significance level of 0.05. Therefore, the hypothesis, "there is no significant difference between group mean scores on reading comprehension at classroom temperatures of 90-95°F and 68-74°F," was not rejected. There were no significant differences between group mean scores on reading comprehension at classroom environmental temperatures of 90-95°F and 68-74°F (comfort zone).

Table 1
Sample Size and Mean Scores of Reading Comprehension by Groups

	Control group 68-74°F		Experimental group 90-95°F	
Test center	M	n	M	n
School 1	81.52	10	78.40	12
School 2	69.15	12	77.80	6
School 3	79.16	16	76.50	12
School 4	81.00	10	78.60	15
School 5	87.20	12	77.67	12
School 6	80.23	6	79.42	7
Total	79.54	66	78.01	64

Table 2
Analysis of Variance Results for Differences in Reading Comprehension at Selected Temperature Levels

Source	df	SS	MS	F	p
School	5	0.09285	0.01857		
Treatment	1	0.02635	0.02635	1.52	0.2720
School/treatment	5	0.08650	0.0173	0.38	0.8597
Error	118	5.33215	0.0452		
Total	129	5.53785			

The hypothesis, "there is no significant difference between group mean task completion times at classroom environmental temperatures of 90-95°F and 68-74°F," was examined to determine the effects of temperature on task completion time. The hypothesis was tested at the .05 alpha level.

Data for the analysis of task completion time consisted of the time, measured to the nearest second, required by each student to complete the required reading task. A task completion time was recorded by the researcher as each student completed his/her reading task. Analysis of variance was used to test the significance of difference among the group means reported in Table 3. The results of the analysis of variance are reported in Table 4. The obtained p value for the experimental study was 0.5334, which indicated the treatment effect was not statistically significant at a significance level of 0.05. The increase in the temperature from the comfort zone (68-74°F) to 90-95°F did not significantly affect the time required for the students to complete the reading tasks.

Table 3
Sample Size and Mean Scores of Task Completion Time in Minutes by Groups

	Control group 68-74°F		Experimental group 90-95°F	
Test center	M	n	M	n
School 1	5.30	10	6.25	12
School 2	4.50	12	4.80	6
School 3	5.25	16	5.85	12
School 4	5.15	10	5.00	15
School 5	5.20	12	6.25	12
School 6	6.35	6	6.10	7
Total	5.20	66	5.73	64

Table 4
Analysis of Variance Results for Differences in Task Completion Times for Activities Requiring Cognitive Performance at Selected Temperature Levels

Source	df	SS	MS	F	p
School	5	148459.9329	29691.9866		
Treatment	1	4214.3777	4214.3777	0.45	0.5334
School/treatment	5	47144.0564	9428.8113	1.40	0.2306
Error	118	796810.8778	6752.6345		
Total	129	996629.2448			

Therefore, the hypothesis was not rejected. There were no significant differences between group mean task completion times at classroom environmental temperatures of 90-95°F and 68-74°F.

CONCLUSIONS AND/OR RECOMMENDATIONS

Past research has been contradictory with respect to the effect the thermal environment has on learning performance and task completion time. Harner (1973) concluded that reading comprehension was significantly reduced when temperature exceeded 73.4°F. McVey (1969) found that educational tasks showed an impairment at 87°F. Hancock (1982) reported that mental and cognitive performance exhibited a decline as environmental temperature exceeded 85°F. On the other hand, Chiles (1958) concluded that mental task performance was not significantly reduced when exposed to 90°F temperature for one hour and Hansen (1966) concluded that there was no significant decline in learning in different thermal environments.

Based upon the statistical analysis of the data in this study, the following conclusions were drawn:

1. Elevated temperatures as high as those ranging from 90 to 95°F in agricultural education classrooms will not have a significant effect on reading comprehension for time durations of 45 minutes or less.

2. Elevated temperatures as high as those ranging from 90 to 95°F in agricultural education classrooms will not have a significant effect on the amount time it will take students to complete tasks requiring cognitive performance when the students are exposed to the elevated temperatures for time durations of 45 minutes or less.

Based on the findings and conclusions of this study, it is recommended that:

1. Further research be conducted to determine the results that elevated temperatures, ranging from 90 to 95°F, in agricultural education classrooms for time periods longer than 45 minutes have on reading comprehension and task completion time.

2. Further research be conducted to determine if students perform differently under varying temperatures when subjected to different teaching methods.

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THE EFFECTS OF ELEVATED TEMPERATURES ON READING COMPREHENSION AND TASK COMPLETION TIME IN THE AGRICULTURAL EDUCATION LEARNING ENVIRONMENT

A Critique

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Environmental impact on educational preparation is a timely topic. School buildings are aging, new schools are being constructed, school calendars are being modified, and it has been suggested that the overall climate of the planet is changing. Knowing these factors, Jewell, Kirby, and Gregory asked a pertinent question in their study. They conducted a project to answer questions regarding a school's environment and effect on educational preparation of students.

This study was conducted with careful and appropriate methodology. The researchers used a suitable quasi-experimental treatment and worked hard to eliminate any treatment bias. The written report of the research was excellent; the reader was left with few questions about how or why the research was completed.

The actual results of this study may have been a concern to the research team. They found their subjects did not differ under either treatment. The students' reading comprehension and task completion times were the same regardless of the temperature of the classroom. Armed with this knowledge, would school districts react and manipulate building temperature to save energy costs? The researchers must be ready to combat this response. One weakness of this type research may be a beneficial condition to reduce reactionary measures. Could the subjects have performed due to some experimental effect? The students may have knowingly or unknowingly worked harder in their classes, because they were involved in an experiment. Both groups (control and treatment) were given directions by a person other than their teacher. They knew they were involved in a non-traditional classroom activity. Did they comprehend their reading assignments and complete the tasks well because they knew they were in an experiment? As the researchers evaluate their techniques, treatments, and results, they may wish to consider if an experimental effect existed with the study.

It is suggested that this research project be conducted over a longer time period. If students were exposed to the treatment on a regular basis, then the experimental effect may be reduced. As students became comfortable with the treatment, it loses its uniqueness and results may vary from the results of this experiment. By lengthening the study, researchers may find students do not learn as well in elevated temperatures.

FACTORS INFLUENCING MINORITY AND NON-MINORITY STUDENTS TO ENROLL IN AN INTRODUCTORY AGRISCIENCE COURSE IN TEXAS

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FACTORS INFLUENCING MINORITY AND NON-MINORITY STUDENTS TO ENROLL IN AN INTRODUCTORY AGRISCIENCE COURSE IN TEXAS

INTRODUCTION AND THEORETICAL FRAMEWORK

The United States, including Texas, is experiencing a demographic shift that will continue into the twenty-first century. The National Council for Agricultural Education in 1989 recognized this shift in stating that one of the national goals of agricultural education is "to serve all people and groups equally and without discrimination" (p. 4). It is predicted that in Texas, current minority groups will constitute over 50 percent of the State's population by the year 2025 (Murdock, Hoque, & Hamm, 1989). The Texas student population in 1990 contained a minority-majority with Whites comprising only 49.5 percent of the overall student population (Garcia, 1991). The secondary enrollment in Texas public schools for the 1990-91 school year was 51.9 percent White, 13.9 percent Black, 31.7 percent Hispanic, 2.3 percent Asian-Americans, and 0.2 percent Native Americans (Texas Education Agency, 1991). However, the percentage of minorities enrolled in agriscience courses did not reflect the percentage of minorities in either the overall school age population or the secondary school population. In the 1989-90 school year, the agricultural education enrollment in secondary schools in Texas was composed of 75.0 percent White, 6.0 percent Black, 18.0 percent Hispanic, and 1 percent Asian-Americans, Native Americans, and others (Eudy, 1991).

The theoretical base for the study comes from the literature that details the uniqueness of minority adolescents. Ogbu (1986) argued that minorities who were incorporated into American society against their will are different from the White majority and from other minorities such as immigrants. He called these groups "castelike minorities" and gave as examples Blacks, Hispanics, and Native Americans. Boykin (1986) expanded on this theme by proposing the theory that minorities must cope within three areas. Everyone, including Whites, interacts within the "mainstream" or majority culture. Next, there is a separate minority culture that groups like Blacks, Hispanics, and Asian-Americans contribute to and experience. Finally, each minority group has its own distinct actions, reactions, and experiences that fit into the majority culture with varying degrees of success. Longstreet (1978) stated that ethnic groups are different in five aspects of style. These are verbal and nonverbal communication, orientation modes, social value patterns, and intellectual modes. Longstreet used these aspects to conduct observations of minority and non-minority students in classroom settings and found that the minority students were different.

PURPOSE AND OBJECTIVES

The purpose of this study was to identify factors influencing minority and non-minority students to enroll in an introductory agriscience course in Texas.

The objectives used to accomplish the purposes of the study were:

1. To describe selected demographic and situational characteristics of minority and non-minority students enrolled in an introductory agriscience course; and,
2. To compare minority and non-minority students enrolled in an introductory agriscience course in Texas on reasons for enrolling, perceived barriers to enrolling, and attitudes toward agriculture.

METHODS AND PROCEDURES

Because the study was conducted after all of the factors had exerted their influence on the variables in question, ex post facto research methodology was used. The population of the study consisted of all students enrolled in Agriscience 101, "Introduction to World Agricultural Science and Technology," and Agriscience 102, "Applied Agricultural Science and Technology," in Texas public schools during the Fall semester, 1991. The 60 agriscience departments in the sample were selected using the stratified random method. Fifty-seven schools responded resulting in a 95 percent response rate. The sample contained 1399 total students. The sample was surveyed using a five-part questionnaire developed by the researcher based on similar questionnaires by Flores (1989) and Marshall (1990).

Descriptive statistics generated by SPSS^{x} procedure FREQUENCIES were used to address Objective One. The overall sample frequency counts and percentages were generated first, then the data file was split by student ethnicity to obtain frequency counts and percentages for each ethnic group. Next, scales were developed, both conceptually and empirically, to measure students' reasons for enrolling, perceived barriers to enrolling, and personal opinions toward agriculture. The Agriculture scale measured the influence of the agriscience course and agriculture in general on the student's decision to enroll. The Disavowance scale measured the extent to which the student felt enrolling was out of his/her control. The Personal Negative scale measured the influence of negative interactions with other students, while the Teacher Negative scale measured negative interactions with the agriscience teacher. The Course Negative scale measured the degree that perceived course attributes were a barrier to enrolling. Negative perceptions that the student held toward agriculture were measured by the Agriculture Negative scale. The student's personal opinions about agriculture were measured using scales for the likelihood of the student to enter an agricultural career, the variety and scope of the agriculture industry, and the requirements needed to obtain a job in agriculture. Analysis of Variance (SPSS^{x} procedure ONEWAY) was used to compare the students' minority status (independent variable) on the scaled variables (dependent variables) to satisfy Objective Two.

RESULTS AND FINDINGS

The sample contained an ethnic distribution similar to that of the population. Table 1 shows the sample distribution by ethnicity. Blacks were 6.3% of the sample, while Hispanic students made up 17%. Whites (72.5%) were a majority of the sample. Less than 1% of the sample identified themselves as Asian-American. Although less than 1% of the study population was Native American, 47 students (3.4%) in the sample identified themselves as such. The ethnicity item on the questionnaire was worded "American Indian" in an attempt to avoid students identifying themselves as "Native American" because they were born in America. This confusion may be one explanation for the discrepancy. However, another explanation may be that adolescents feel pride in identifying themselves with whatever percentage of Native American ancestry they possess, no matter how small or none at all.

Table 1

Ethnicity of Students in the Sample

Black n (%)	Hispanic n (%)	Ethnicity White n (%)	Asian-American n (%)	Native American n (%)
88 (6.3)	237 (17.0)	1011 (72.5)	11 (0.8)	47 (3.4)

This sample contained a mixture of Black, Hispanic, and White teachers. However, a few students identified their teacher's ethnicity as either Asian-American or Native American even though the remainder of the students from that same school did not identify the teacher as such. Therefore, only student responses of Black, Hispanic or White teacher ethnicity are reported. As shown in Table 2, an overwhelming majority (93.0%) of students identified the ethnicity of their teacher as White. Less than 2% of the students had a Black teacher, and less than 6% an Hispanic teacher. However, 5.9% of Black students in the sample had a Black teacher, 91.8% a White teacher, and 2.4% an Hispanic teacher. Although a majority of Hispanic students (70.0%) had a White teacher, 27.8% had an Hispanic teacher and 2.3% a Black teacher. Only 16 of the 1,011 White students (1.6%) had a Black or Hispanic teacher.

Table 2

Percentage of Students with Teachers of Each Ethnicity

	Teachers' Ethnicity		
Ethnicity of Student	Black n (%)	Hispanic n (%)	White n (%)
Black	5 (5.9)	2 (2.4)	78 (91.8)
Hispanic	5 (2.3)	64 (27.8)	161 (70.0)
White	8 (0.8)	8 (0.8)	991 (98.4)
Overall	18 (1.4)	74 (5.6)	1230 (93.0)

Table 3 shows the residence of the agriscience education students. Students in the sample were more likely to live on a farm or ranch than the general United States population. This percentage (17.6%) is much higher than the less than 5% of the American population that lives, works, or receives income from a farm. Another 25% of the sample resided in a rural area, but not on a farm or ranch. The largest percentage of students (31%) identified their residence as small town (population of less than 5,001). The remainder of the sample (26.3%) lived in an urban (population of more than 50,000) or suburban area (population of 5,001 to 50,000). White students tended to reside on a farm or in a rural area (46.3%) more than in a small town (25.7%) or a suburban or urban area (28.0%). Black students were less likely than Whites to live on a farm or in a rural area (35.6%), more likely to live in a small town (35.6%), and equally likely to live in an urban or suburban area (28.7%). The Hispanic students in the sample were more likely to live in a small town (51.9%) than on a farm or in a rural area (30.8%) or in an urban or suburban area (17.3%).

Table 3

Residence of Students in the Sample

	Place of Residence				
Ethnicity	Farm n (%)	Rural n (%)	Small Town n (%)	Suburban n (%)	Urban n (%)
Black	12 (13.8)	19 (21.8)	31 (35.6)	19 (21.8)	6 (6.9)
Hispanic	26 (11.0)	47 (19.8)	123 (51.9)	33 (13.9)	8 (3.4)
White	195 (19.4)	271 (26.9)	259 (25.7)	216 (21.4)	66 (6.6)
Overall	245 (17.6)	349 (25.0)	432 (31.0)	284 (20.4)	84 (6.0)

Membership in 4-H was not prevalent within this sample (See Table 4). Agriscience students who were also 4-H members, or had ever been members, constituted only 36.5% of the sample. White students (39.3%) were more likely than Blacks and Hispanics to be past or present 4-H members. Only 34.9% of Blacks and 22.4% of Hispanics were either present or past 4-H members.

Table 4

Membership in 4-H

	Current or Previous Membership	
Ethnicity	Yes n (%)	No n (%)
Black	30 (34.9)	56 (65.1)
Hispanic	52 (22.4)	180 (77.6)
White	395 (39.3)	609 (60.7)
Overall	505 (36.5)	877 (63.5)

Tables 5 through 7 show the ANOVA results for the selected scales by the variable MINORITY STATUS. For this variable, students who identified their ethnicity as Black or Hispanic were coded as "yes"; students who identified their ethnicity as White were coded as "no." Table 5 shows that non-minorities were more likely than minorities to enroll in the agriscience course because of agricultural and agricultural education course reasons. On the other hand, the Disavowance scale shows that minority students more so than non-minority students enrolled in the agriscience course for reasons perceived to be out of their control.

Table 5

ANOVA of Students' Reason for Enrolling Scale Scores by Minority Status

Scale	Minority Status	Mean	Standard Deviation	F Ratio	F Prob.
Agriculture	Yes	2.3343	.6823	85.2702	<.01
	No	2.7343	.6590		
Disavowance	Yes	1.5600	.8704	52.0622	<.01
	No	1.1681	.8465		

The Barriers to Enrollment scales (Table 6) show an opposite effect from the Reasons for Enrolling scales. All of the Barriers scales have means below 2.0 which may lead to the conclusion that none of these constructs are barriers to enrolling. However, the range of scores for the individual scales included students' scores that approached "strongly agree." Therefore, another interpretation may be that any one barrier is enough to keep students from enrolling even though overall barriers are low. Also, one must remember that regardless of perceived barriers, all students in this study did enroll. Students who had the opportunity to enroll, but did not may tend to have higher scores for the Barriers scales. Therefore, for analysis purposes, a higher mean will be described as a perception of a greater barrier.

Minority students were more likely to perceive barriers to enrolling than non-minority students. Minority students perceived other students as being the greatest barrier to enrolling. The Teacher Negative scale yielded the lowest mean among minority students, indicating that the teacher was the least significant barrier.

Table 6

ANOVA of Students' Barriers to Enrollment Scale Scores by Minority Status

Scale	Minority Status	Mean	Standard Deviation	F Ratio	F Prob.
Personal Negative	Yes	1.5930	.7898	46.0754	<.01
	No	1.2198	.8768		
Teacher Negative	Yes	1.3710	.8434	32.1939	<.01
	No	1.0356	.9415		
Course Negative	Yes	1.5522	.8224	44.7291	<.01
	No	1.1674	.9213		
Agriculture Negative	Yes	1.4758	.8640	33.5023	<.01
	No	1.1367	.9256		

Table 7 shows the students' Personal Opinions by Minority Status. For all three scales, non-minority students had the more positive attitudes. Non-minority students saw more career opportunities for themselves in agriculture, more occupational diversity within agriculture, and showed more agreement that occupations in agriculture require knowledge and expertise. For all three scales, minority students approached "neutral" in their attitudes.

Table 7

ANOVA of Students' Personal Opinions Scale Scores by Minority Status

Scale	Minority Status	Mean	Standard Deviation	F Ratio	F Prob.
Personal Career	Yes	2.3512	.7935	47.4834	<.01
	No	2.7209	.8298		
Agricultural Occupations	Yes	2.4563	.7491	55.7732	<.01
	No	2.8064	.7165		
Occupational Requirements	Yes	2.3051	.7205	56.4975	<.01
	No	2.6370	.6669		

CONCLUSIONS

1. The ethnic composition of AGSC 101 and 102 classrooms was not proportional to that of Texas public schools. Minority students were underrepresented in these two introductory agriscience courses. These two courses are the gateway to future enrollment in agriscience courses. Unless minority enrollment in AGSC 101 and 102 is increased, overall minority enrollment in agriscience education will continue to be small.

2. Most agriscience students had a White teacher. If, as the literature suggests, students need role models of their own ethnicity to guide them into educational programs and subsequently into occupations, then minority students will continue to perceive agricultural occupations as not desirable for them unless more minority teachers are employed.

3. Black and Hispanic students had less of a rural background than White students. They also had more negative attitudes towards the traditional parts of agriculture. To overcome these biases, the urban aspects of agriculture may be emphasized to help in recruiting minority students into agriscience education.

4. Minority agriscience students, especially Hispanic students, did not have 4-H experience to the same extent as White students. Because 4-H membership is related to a positive attitude toward agriculture, involving minority youth in 4-H might lead to higher enrollments in agriscience education.

5. Minority students were less inclined to enroll in AGSC 101 and 102 courses for agricultural reasons, and more likely to feel that they were in the course because of circumstances beyond their control. They perceived more barriers to enrolling and had more negative attitudes toward agriculture and agricultural

occupations. Until minority students' perceptions change and barriers to enrollment are removed, greater minority participation in agriscience education should not be expected.

RECOMMENDATIONS

1. Adolescents seem to form attitudes regarding agriculture by the ninth grade. Because few minority students had either 4-H experience or were from farm/rural backgrounds, they lack early, positive images of agriculture and agricultural education. Agricultural education should focus awareness and informational activities on the elementary grades and should conduct recruitment activities no later than the middle school grades.

2. The literature reveals that positive role models of the same ethnicity can be influential factors for students to enroll in agriscience course and ultimately pursue agricultural careers. Agriscience education should work to increase the number of minority teachers in public schools. On an immediate basis, agriscience teachers should utilize minority agricultural professionals as guest speakers, job placement coordinators, chaperones, and assistants for FFA activities. In addition, minorities should be depicted in instructional materials.

3. Because minority students were more likely to enroll for disavowance reasons, educators need to discourage the practice of dumping these students into agriscience courses. Efforts should be made to change the negative perception of agriculture that guidance counselors and others in influential roles may hold.

4. Local agriscience teachers need minority recruitment strategies and publications available on demand. These strategies and publications should be developed based on research and should be supplied to teachers in a self-contained, ready-to-use form.

5. Once minority students have enrolled in one agriscience course, efforts need to be made to ensure their success and continued enrollment. These retention efforts should be based on research and should be supplied to agriscience teachers in a self-contained, ready-to-use form.

6. The comparisons of minority and non-minority students in this study were between students already enrolled in the agriscience course. Research should be conducted comparing minority students not enrolled in an agriscience course with those enrolled in an agriscience course.

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FACTORS INFLUENCING MINORITY AND NON-MINORITY STUDENTS TO ENROLL IN AN INTRODUCTORY AGRISCIENCE COURSE IN TEXAS

A Critique

Donald M. Johnson, Mississippi State University-Discussant

Goal Two of The Strategic Plan for Agricultural Education states that agricultural education is "To serve all people and groups equally and without discrimination." This is a laudable goal. I commend the researchers for conducting a study which may help to make this goal a more perfect reality.

The theoretical framework for the study was well-developed. I commend the researchers for developing their theory base from a sociological model and applying this model to a relevant problem in agricultural education. The purpose and objectives were clearly stated. Moreover, they were appropriate and logical extensions of the literature review.

The procedures section left unanswered questions. What was the size of the population (both in number of departments and number of students)? Was the sample size adequate to generalize to the population? It may well have been. We simply are not given enough information to make a decision.

Fifty-seven of 60 departments responded for a 95% response rate. While this is an excellent response rate, what percentage of students included in the sample actually provided useable responses? This information should also be reported.

Was the instrument a valid and reliable measure of the constructs being studied? It may well have been. Again, we are not provided with enough information to make this decision. This is an important omission.

The results were clearly presented except that no description of the rating scale was provided. Thus, the means and standard deviations had only limited meaning.

I read the conclusions and recommendations with great interest. For the most part, they were well-formulated. However, to me the two most important findings of the entire study were that: (a) minorities perceive other students as being the greatest barrier to enrollment and (b) the teacher was perceived as the least significant barrier to enrollment. What can you conclude from these findings and what are your recommendations for action and further research?

I commend the researchers for examining an issue of great importance to the profession. This research is significant. I am certain the authors will answer many of my questions in their response.

FIELD EXPERIENCES REQUIREMENTS FOR NON-TEACHING AGRICULTURAL EDUCATION MAJORS IN THE UNITED STATES

by

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FIELD EXPERIENCES REQUIREMENTS FOR NON-TEACHING AGRICULTURAL EDUCATION MAJORS IN THE UNITED STATES

INTRODUCTION AND THEORETICAL FRAMEWORK

Field based experiences have been an accepted means of bridging the gap between education and the real world of employment in many fields, from medicine and law to sociology and religion. These experiences allow individuals to have professional experiences and to practice the activities required of the profession. Field experiences developed as professions evolved from an apprenticeship program into academic subjects (Anderson, Mort and Soler, 1982). Field experiences involve observation, clinical experience with clients, active participation and the paperwork involved with the profession (Deeds, 1985).

Field based and clinical experiences are not uncommon in undergraduate majors other than education. A review of the Mississippi State University catalog reveals field experiences or practicums required in both technical and social science areas (MSU, 1992). Field experiences are required in areas ranging from social work and pharmacy to dietetics and golf course management.

The length of the field experience varies. Some programs making use of cooperative education have several months of field experience. A series of field courses over several semesters or a three to six week concentrated experience is required in other areas.

Field experiences have been a part of agricultural teacher education since its inception. Agricultural education departments have changed and expanded curriculum options as noted in a recent report of AAAE Ad Hoc Work Group (Herring, 1992); however, have they also changed and expanded field experience programs?

Departments responding to the work groups survey indicated numerous curriculum options such as Extension education, agricultural communication, general agriculture, agriscience, agricultural development and leadership in addition to the traditional agricultural education teaching option. Thirty-three of the 78 departments responding indicated that they had seen a "Broadening of the mission to encompass the preparation of professionals for roles other than formal teaching/Curriculum reorganization/Addition of options, majors, or degree programs" (Herring, 1992 p.7).

The field experiences, early field based and student teaching for students in pre-service teacher education programs are mandated by the National Council for Accreditation in Teacher Education standards and often by state certification agencies. No such regulations or standards exist for non-teaching agricultural education programs. So the question arises: What are departments with non-teaching agricultural education majors doing concerning field experiences for those students?

PURPOSES AND OBJECTIVES

The purpose of this study was to determine the extent to which agricultural education departments had non-teaching agricultural education degrees or options and if any field experiences were required for the completion of a degree. The specific objectives of the study were as follows:

1. To determine the number of departments with a non-teaching agricultural education degree or option and the extent of field experiences required.

2. To determine what assignments or activities were required during field experiences for non-teaching degree students.

3. To determine the nature of the field experience placements including length, timing, placement site and credit earned.

4. To determine the type and scope of supervision during the field experiences of non-teaching agricultural education majors.

5. To determine if significant relationships existed in the characteristics of the field experience based on the selected demographics.

METHODOLOGY

Data for the study were collected using a researcher developed instrument in the Fall of 1992. Content validity of the instrument was determined by a panel of experts made up of agricultural education faculty and graduate students. The frame for the study was all 97 institutions listed in the AAAE Directory for 1992. The instruments were mailed with a cover letter and stamped return envelope to department heads indicated in the directory. Non-respondents were sent a follow up postcard after the September 18 return date. A second mailing of the instrument was completed in early October. All non-respondents were contacted by phone and asked to complete the instrument. Five institutions indicated that they no longer had agricultural teacher education programs at their institution, making the final population 92 institutions.

The total response rate was 89 percent with 82 of the 92 institutions responding. The instrument consisted of 39 forced choice questions concerning field experience requirements and expectations as well as demographic information concerning the institutions. The nature of the instrument made the determination of a reliability coefficient inappropriate. Data were analyzed using SPSSpc with an a priori alpha level of .05.

FINDINGS OF THE STUDY

The responding institutions represented all of the AAAE regions. Southern region had the most respondents with 36 (43.4%) followed by central with 19 (22.9%), and western and eastern regions each with 14 (16.9%) responding institutions. A majority of the respondents (58 or 69.9%) indicated they were located in a college of agriculture. The next most common location was the college of education with 15 (18.1%) followed by joint appointments in five (6.0%) institutions and the same number reporting their location as other than those listed.

The responding institutions indicated an average of 2.4 faculty supervising field experiences with a range of 1 to 10. A majority of the institutions had 1 or 2 faculty members supervising field-based experiences. (Table 1)

Table 1
Number of Faculty Members Involved in Field Experience Supervision

Number of Faculty Members	Frequency	Percentage
1 - 2	51	61.4
3 - 4	23	27.8
5 - 6	7	8.4
7 - 8	1	1.2
9 - 10	1	1.2
Total	83	100.0

Graduate students were not used to supervise field experiences in 68 (82.9%) of the responding institutions. Six (7.3%) institutions used one graduate student supervisor, four (4.9%) used two, three (3.7%) used three and one institution used four.

Over 85% of the responding institutions had less than 50 non-teaching agriculture education majors in their department. The number of students enrolled in a non-teaching agricultural education degree ranged from 2 to 220 students. The mean number was 35.9. Table 2 indicates that four schools reported 100 or more students in the non-teaching degree option.

A non-teaching degree in agricultural education, other than agricultural communications was offered by 32 (39%) of the institutions responding. (Two institutions reported having an extension education option but did not consider it a non-teaching agricultural education degree, so they did not respond to the field experience questions.) Twenty-one (65.6%) of reporting institutions indicated that they required a field experience for their non-teaching degree students. Field experience was a part of another class for seven of the respondents while 17 indicated that field experience was a separate course. (This indicates that some of the institutions require more than one experience). Credit awarded for the separate class ranged from 1 to 16 credit hours (semester hours) with a mean of 6 credit hours. The number of clock hours of field experience required varied from 40 to 480 with a mean of 289.

Table 2

Number of Non-Teaching Agricultural Education Majors

Number of Majors	Institutions	Percentage
1 - 25	21	70.0
26 - 50	5	16.7
51 - 100	0	00.0
101 - 200	3	10.0
201 - 300	1	3.3
Total	30	100.0

The nature of the experience in timing and site placement was varied. The field experience can be completed whenever it fits into the students program in six institutions, during the academic year only in five cases and a combination of academic year and summer for ten others. Non-teaching field experience sites are most often selected by the students (6) or by students selecting from an faculty-approved list (4). In three institutions, the faculty assign the field experience site. Eight institutions indicated they used another method of assignment, usually a combination of student selection and faculty approval.

The most frequently used agency for non-teaching field experience was the Cooperative Extension Service (85%). Table 3 shows the extent to which the various agencies were approved as field experience sites. Respondents indicated that other agencies, such as the state department of agriculture, forest service and Farm Bureau were also used. In response to a question about other sites, 12 respondents also indicated that they used agribusinesses and industry as field experience sites for non-teaching students.

Respondents were asked to indicate from a list the assignments or activities required for a grade in field experience. Students were most often required to observe professionals and to keep a diary of experiences. Table 4 indicates responses to possible assignments or activities. Other requirements indicated were a resource notebook and completion of a special project.

Table 3
Types of Agencies Used for Field Experience Sites

Type of agency used	Frequency	Percentage
Cooperative Extension Service	17	85
Soil Conservation Service	13	65
Other agencies/agribusiness	12	60
Farmers Home Administration	11	55

Thirteen of the departments indicated that they did not have special requirements for on-site supervisors of non-teaching field experience students. Of the seven departments with special requirements, all required at least a bachelors degree and two required a masters. Most institutions did not have any specific length of time in the profession or number of years in their current position required for a person to serve as a supervisor. Two respondents each indicated that non-teaching field experience supervisors were required to have special training and be a member of their professional organization.

Table 4
Assignments/activities required for non-teaching field experience grade

Assignment/activity required	Number	Percentage
Observe professionals	21	100.0
Keep a diary of experiences	18	85.7
Attend professional meetings	13	61.9
Teach or conduct meetings	13	61.9
Participate in youth group work	13	61.9
Make field visits	13	61.9
Participate in adult group work	12	57.1
Participate in community activities	11	52.4
Keep financial records	5	23.8
Survey community resources	5	23.8

Non-teaching field experience was supervised by university personnel in 12 (60%) of the institutions that reported having the experience. The range in the number of visits was from one (3) to three (3), with two being both the mean and the mode with eight institutions.

In determining differences in the characteristics of the field experience, based on the demographics only, three items were found to be significant at the .05 level. The institutions in the Southern region were more likely to require a field experience of their non-teaching option students (Chi Square = 9.4, DF = 3). Institutions in the Southern region were also more likely to require youth group work (Chi Square = 8.28, DF = 3) and participation in community activities (Chi Square = 9.97, DF = 3) as part of the experience than those in the other regions.

CONCLUSIONS AND RECOMMENDATIONS

Agricultural education programs nationwide have expanded their mission in the past 10 years with over 40% of the departments providing a non-teaching agricultural education or Extension education degree, other than agricultural communications. Field experience is required for graduation in the non-teaching degree by nearly two-thirds of the institutions. This diversity is positive and is supported by the AAAE Work Group on Developing Curriculum Options in Agricultural Education (Herring, 1992).

The findings do generate some concern in the type and scope of the experiences non-teaching ag ed majors receive and the quality of the field experiences. Because fewer requirements are placed on sites and supervisors in this experience and fewer are supervised on-site, the quality of the experience is not known. The reporting institutions have historically been and are still primarily agricultural teacher education programs. It might be questioned if they are providing an appropriate field experience for their non-teaching agricultural education option or degree students.

The non-teaching agricultural education students are required to complete an average of 6 credit hours of field experience, which is half the average 12 credits earned for student teaching, as found in a parallel study. The non-teaching field experience averages just over 7 weeks long compared to an average of 12 for the student teaching experience.

Fewer restrictions are placed on non-teaching field experience sites and supervisors. Students are more likely to be able to select their non-teaching field experience site than student teachers. The number and types of field experience assignments and activities required of non-teaching field experience students were very limited compared to those outlined for student teachers.

The majority (65%) of institutions with a non-teaching degree field experience did not report any special requirements for an individual serving as an on-site supervisor. Two-thirds of the institutions required cooperating teachers to have special training while less than 10 percent (2) with non-teaching field experience required any special training for cooperating on-site professionals.

All student teachers were to be supervised by university personnel a mean of four times while 60 percent of the non-teaching field experience students receive supervisory visits and the majority of those who did receive one or two.

It is recommended that further investigation be completed on the type and scope of field experience completed by non-teaching agricultural education majors.

It is further recommended that those institutions with non-teaching agricultural education degrees or options give serious consideration to field experiences for these students to answer some of the following questions. Is the length of time for field experience adequate to prepare students for the job market? Should field experience sites and on-site supervisors meet stricter standards than are currently required? Should number and scope of assignments or activities be increased or made more specific?

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FIELD EXPERIENCES REQUIREMENTS FOR NON-TEACHING AGRICULTURAL EDUCATION MAJORS IN THE UNITED STATES

A Critique

Joe W. Kotrlik, Louisiana State University--Discussant

This study addresses a relatively new aspect of agricultural education programming, the quality of field experiences for non-teaching agricultural education majors. The limited body of literature in this area is an appropriate reason for conducting research in this area. It is especially important in view of the agricultural education profession's diversification goals and related program redesign efforts.

The author produced an orderly and focused review of the literature that served as an excellent theoretical base for this study. The review provided appropriate depth, considering the limited research available in this area. The purpose and objectives were tightly worded and explicit, and the design of the study and instrumentation were suitable for this study. Non-respondent bias was adequately addressed in the manuscript.

The only major concern I had with this manuscript was the use of inferential statistics on population data. The author set an alpha level and then used the Chi-square Goodness of Fit test to analyze population data, with both of these steps being inappropriate.

A side issue centered around the breadth of the study. The author did address the use of field experiences for non-teaching majors as declared in the objectives of the study. I wish that the authors would have incorporated a major related issue into this study--the structure of degree requirements for non-teaching majors. It seems that this would have been an appropriate and reasonable time to study this issue.

I commend the researchers for undertaking this study and want to encourage them to conduct additional research relative to field experiences for non-teaching agricultural education majors. On a national basis, the future of university agricultural education programs will be impacted by the ability of agricultural educators to design quality programs for non-certification majors. The results of this paper provide reason for concern about the quality of field experiences for non-teaching agricultural education majors.

A FOLLOW-UP STUDY OF THE GRADUATES FROM THE MASTERS PROGRAMS IN AGRICULTURAL AND EXTENSION EDUCATION AT MISSISSIPPI STATE UNIVERSITY

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INTRODUCTION AND THEORETICAL FRAMEWORK

The Department of Agricultural and Extension Education at Mississippi State University has offered several options for persons seeking graduate studies, including masters, educational specialist, and doctoral degrees. For persons pursuing masters degrees, the department has offered four options: the Master of Agriculture, Master of Education, Master of Extension Education, and Master of Science (Department of Agricultural and Extension Education, 1988).

The department is currently facing the possibility of major changes in its degree offerings. Of the four masters degrees offered, the Master of Agriculture and Master of Extension Education degrees have been targeted for possible elimination.

The need for this follow-up study came partly because of the possible changes being faced by the Agricultural and Extension Education Department. The input of alumni was also desired for help in making improvements in the masters programs of study and in preparing for an upcoming accreditation review.

The follow-up study is often used in an effort to evaluate the success of a particular program or various aspects of a program. Follow-up studies are concerned with examining the subsequent development of subjects after they have been through some type of treatment or program (Ary, Jacobs, & Razavieh, 1990; Bledsoe, 1972).

A follow-up study is an effective way to evaluate the merit of an agricultural education program and determine how well the program has prepared its graduates for agricultural professions. It is also an effective way to obtain suggestions for educational program improvements. In a follow-up study, the survey can be a way of involving former students in an evaluation of the curriculum. It can also be a means for better understanding the nature of employment for which students are prepared. Former students can provide their views on how successful the school was in preparing them for entry and advancement in their chosen professions (Lamberth & Byler, 1991).

In a follow-up study of doctoral graduates from the Department of Agricultural and Extension Education at Mississippi State University, Randavay (1988) was able to find out how doctoral students viewed the relevance of certain courses to their current occupations. A similar follow-up study was conducted by Ruthven (1989) with doctoral graduates from the College of Education at Mississippi State University, which included students majoring in Agricultural and Extension Education.

The literature reviewed indicates the value of follow-up studies for academic institutions desiring to improve their educational programs and/or policies currently in effect.

PURPOSES AND OBJECTIVES

The purpose of this study was to determine the quality of the masters degree programs of study offered by the Agricultural and Extension Education Department at Mississippi State University as perceived by persons who received a masters degree from the Department of Agricultural and Extension Education from Spring 1986 to Spring 1991. In addition, the study was to determine the satisfaction or dissatisfaction of the graduates with their masters degree program experience in the AEE masters degree options.

Specifically, the study attempted to answer the following questions:

1. How satisfied are graduates with their masters degree programs of study in Agricultural and Extension Education at Mississippi State University?

2. What do graduates perceive to be the strengths of the Agricultural and Extension Education masters degree programs of study at Mississippi State University?

3. What do graduates perceive to be the weaknesses of the Agricultural and Extension Education masters degree programs of study at Mississippi State University?

4. In what types of occupations are these graduates employed?

5. Do these graduates feel their programs of study in Agricultural and Extension Education at Mississippi State University contributed to their present level of job competency?

METHODS AND PROCEDURES

Identification of the Population

The population for this study included all persons who received a masters degree from the Agricultural and Extension Education Department at Mississippi State University from Spring 1986 to Spring 1991 and were American citizens residing inside the continental United States of America during the study period. The names and addresses of the population were obtained from the Agricultural and Extension Education Department and Alumni Association at Mississippi State University. Since the population totaled 57, it was concluded that all 57 graduates should be included in the study.

Selection and Development of the Instrument

The instrument used in this study consisted of a three-page questionnaire eliciting responses of graduates. The instrument consisted of six major parts: (a) degree information, (b) occupation information, (c) general program information, (d) course information, (e) minor or cognate information, and (f) overall perceptions. It included multiple choice items, open response items, and Likert-type items. The validity of the instrument was checked by being field tested with graduate students not included in the population and presented to a panel of experts comprised of Agricultural and Extension Education faculty members. Modifications were made in response to suggestions from the field test and panel of experts review.

Collection of Data

On April 8, 1992, questionnaires, with cover letter and return envelope, were mailed to the population of interest. On April 21, 1992, a follow-up letter and questionnaire was mailed to 28 nonrespondents. The same information was included in the follow-up letter.

Analysis of Data

A total of 53 questionnaires, or 93%, were returned. Descriptive statistics were used to analyze the data. These statistics included means, standard deviations, frequencies, and percentages.

RESULTS AND FINDINGS

During the period under study (Spring 1986 to Spring 1991) a total of 57 masters degrees were awarded from the Department of Agricultural and Extension Education at Mississippi State University. Of these 57, 53 graduates responded to the questionnaire.

The degree most often awarded through the Department of Agricultural and Extension Education at Mississippi State University from Spring semester 1986 to Spring semester 1991 was the Master of Extension Education degree. The second most often awarded degree was the Master of Agriculture, followed by the Master of Education and the Master of Science (see Table 1).

Table 1
Degrees Received by Graduates

Degree	Number	Percent
Master of Agriculture	10	18.8
Master of Education	7	13.2
Master of Extension Education	33	62.3
Master of Science	3	5.7

Of the 53 respondents, the majority (31) were employed with the Cooperative Extension Service in either Mississippi, Alabama, or Tennessee. Eight were vocational agriculture teachers, four were involved in further graduate studies, and two were employed by Farmer's Home Administration. The remaining eight were in various other occupations.

On a scale of 1 to 5, with 1 being "not at all adequate" and 5 being "very adequate", AEE faculty accessibility received a mean rating of 4.5, the highest rating of six general aspects of the masters programs. The remaining general aspects were final oral examination, AEE faculty guidance, and AEE faculty instruction in classes, each with a mean of 4.4, preadmission information offered by the AEE Department with a mean of 4.2, and AEE Department facilities with a mean of 3.7.

Respondents were asked to rate the relevance to their current occupations of 15 courses offered by the Department of Agricultural and Extension Education. A Likert-type scale was used with 1 being "not at all relevant" and 5 being "very relevant". Of the 15 courses, Comprehensive Instructional Programs for AEE was the most relevant with three respondents replying for a mean rating of 4.7. The next most relevant courses were Public Relations in AEE (M = 4.5; n = 33), Applications of Computer Technology to AEE (M = 4.4; n = 27), Advanced Communications in AEE (M = 4.3; n = 23), and Administration and Supervision in AEE (M = 29; n = 29).

The least most occupationally relevant courses offered were Evaluation of AEE Programs (M = 3.8; n = 28), Applying Research Methods to AEE (M =3.7; n = 23), Development of Youth Programs (M = 3.7; n = 22), History, Philosophy and Policy of AEE (M = 3.4; n = 16), and International Agricultural Education (M = 2.7; n = 7). In contrast, doctoral graduates in the Randavay study (1988) rated the Evaluation and the Research Methods courses as some of their most occupationally relevant courses.

Of the 53 respondents, 64.2% reported having a minor or taking cognates. The mean rating for relevancy to current occupations for either a minor or cognates was 4.2. Again, a Likert-type scale was used with 1 being "not at all relevant" and 5 being "very relevant".

The greatest strength of the masters degree programs in AEE was the relevance of courses to current occupations, as reported by 62.3% of the respondents. The second greatest strength was faculty/student interaction, as reported by 24.5% of the respondents. The remaining 13.2% perceived the greatest strength to be in classroom instruction.

The greatest weakness of the masters degree programs was dealing with course content with 32.1% making comments in this category. Course content weaknesses dealt with such areas as a lack of practicality, a lack of focus to certain areas, and a lack of technical and high technology training.

Respondents were asked to rate their satisfaction or dissatisfaction of the masters programs on a Likert-type scale with 1 being "very dissatisfied" and 5 being "very satisfied". Only three respondents gave a rating of 3 for their overall satisfaction with their masters study. The remaining ratings were either 4 or 5.

CONCLUSIONS AND RECOMMENDATIONS

Based upon the findings of the evaluation, it was concluded that:

1. The degree most often awarded through the Department of Agricultural and Extension Education at Mississippi State University from Spring semester 1986 to Spring semester 1991 was the Master of Extension Education degree.

2. The majority of graduates from masters degree programs of study in the Department of Agricultural and Extension Education at Mississippi State University were employed by the Cooperative Extension Service.

3. Masters degree graduates generally perceived AEE faculty accessibility, the final oral examination, AEE faculty guidance, AEE faculty instruction in classes, and preadmission information provided by the AEE Department to be adequate.

4. Graduates perceived Comprehensive Instructional Programs for AEE, Public Relations in AEE, and Applications of Computer Technology to be the three most relevant courses to their current occupations.

5. The course graduates perceived as least relevant to their current occupation was International Agricultural Education.

6. Masters degree graduates who opted for a minor or cognates generally perceived their minor or cognates to be relevant to their current occupation.

7. Respondents perceived the greatest strength of their masters studies, overall, to be the relevance of the courses offered to their current occupations.

8. The greatest weakness of their overall masters studies experience perceived by graduates was course content, such as a lack of practicality, lack of focus in certain areas, and not enough technical and high technology training offered.

9. Respondents were satisfied with their masters program of study in the Department of Agricultural and Extension Education at Mississippi State University.

The following recommendations are made on the basis of the findings of the study:

1. Since the Master of Extension Education degree was the most often awarded masters degree from Spring 1986 to Spring 1991, it should continue to be offered by the Department of Agricultural and Extension Education at Mississippi State University. Current considerations to eliminate this degree program should be carefully analyzed before a final decision is made. The same careful analysis should be made regarding the Master of Agriculture degree.

2. Considering the fact that the majority of graduates were Extension professionals, the Department of Agricultural and Extension Education should continue to make every effort to stay abreast of the rapid changes being experienced in the Extension System of the 1990s.

3. Based upon the relatively low mean rating for departmental facilities, the Department of Agricultural and Extension Education should investigate ways to up-date some of its facilities, such as technical and high technology equipment and laboratories for student use.

4. Graduate level courses offered by the Department of Agricultural and Extension Education should be continually evaluated in order to continue providing relevant topics to its students.

5. The International Agricultural Education course should be closely evaluated to determine reasons for its apparent lack of relevance to occupations of graduates. This is especially important as more emphasis is placed on international experiences for college faculty, staff, and students.

6. Consideration should be given to requiring either a minor or cognates for all masters degree programs. With Extension and the agriculture industry facing the likelihood of fewer workers, some degree of specialization beyond education could possibly provide a competitive edge for Agricultural and Extension Education masters graduates.

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A FOLLOW-UP STUDY OF GRADUATES FROM THE MASTER'S PROGRAMS IN AGRICULTURAL AND EXTENSION EDUCATION AT MISSISSIPPI STATE UNIVERSITY

A Critique

Thomas L. Grady, Southwest Texas State University - Discussant

The purpose of this study was clearly focused on determining the quality of the master's degree programs in Agricultural and Extension Education at Mississippi State University by asking graduates questions about the program. The questions were fairly straightforward and led smoothly into the procedures of the study. The literature review, however, was less helpful in developing the rationale for the study. While the title of the first section indicated that a theoretical framework was included, it was not evident. The introduction tended to justify follow-up studies as a methodology for evaluating programs rather than build a foundation for the questions and procedure to follow. The review could have helped define quality and identify some appropriate conceptual and operational indicators. Is a self-report by graduates an appropriate approach to collecting necessary data from which to make evaluative judgments about quality? Would the substance of the questions asked have changed if a clear concept of quality had been developed from the literature? For example, is "type of occupation" an indicator of quality? These questions highlight my concern that this study speaks to a situation and not to a body of knowledge. Consequently, we have questions and methods being driven by arbitrary decisions making the study ad hoc and situational.

The study was a descriptive one with a clearly defined population and straightforward data collection procedures. The data analysis and reporting was appropriate to a descriptive study. It might be interesting to know if graduates were already employed in reported occupations while in graduate school. Could this affect the response to courses being relevant to their occupation? I was not sure why doctoral graduates were contrasted with master's graduates on relevance of evaluation and research methods courses. It seems logical that doctoral graduates are more likely to be involved in research after program completion than master's graduates. Also, some measures are too general, reducing their usability.

Do the findings of this study help us evaluate or establish the quality of the program? If so, how? Again, how was quality determined? For example, Recommendation 1 suggests that the Master of Extension Education degree should be offered because it was the most awarded. Is number of degrees awarded an adequate indicator of quality? The conclusions and recommendations were appropriately limited to the program in question. However, it would be nice to see recommendations for future research resulting from this study.

In future studies, a broader contribution might be made by more directly linking the study to an extant knowledge base, conceptually rather than situationally focused.

THE FUTURE OF THE BROILER INDUSTRY IN THE 21ST CENTURY WITH IMPLICATIONS FOR AGRICULTURAL EDUCATION

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INTRODUCTION AND THEORETICAL FRAMEWORK

Almost everyone would readily agree that we are living in an age of rapid change. Advances in technology and science are making life better for us in many ways. Practically all areas of our society and industry have felt the effects of the need to change or advance in order to "keep up."

The poultry industry is one such indutry that has seen tremendous change over the past fifty years. The industry has grown from one with backyard flocks kept primarily for egg production, to a highly industrialized agribusiness constantly striving for the latest technology in equipment, housing, production, and marketing techniques to assure its position as a leader in food production. The poultry industry is primarily dedicated to the production of broiler meat. The per capita consumption of broiler meat has been steadily increasing due, in large part, to product development and marketing strategies.

The world of change and advanced tehnologies also extends into the realm of education. For example, advanced technologies in the field of agriculture include biotechnology, computers, and electronics. With our world changing so rapidly and our field of knowledge expanding at an accelerating rate, how can our education system possibly keep up? Even more so, how can our vocational education programs which are trying to prepare students for the world of work, possibly keep pace with changing technologies. If indeed we are to "catch up" with our vocational education system and not continue to teach skills that may be obsolete by the time students have an opportunity to use those skills, curriculum planning must take a look into the future.

A futuristic means of research, the Delphi technique, was utilized in this study for determining future characteristics of the broiler industry, from which to recommend curriculum development in agricultural education (Linstone and Turoff, 1975).

PURPOSES AND OBJECTIVES

The purpose of this research was to determine possible characteristics of the broiler industry in the 21st century in order to identify curriculum content necessary to prepare students for careers in the broiler industry of the future.

Specific objectives were to determine:

1. if the Delphi technique would derive consensus among broiler experts concerning the future of the industry;

2. a demographic profile of opinion leaders in the broiler industry;

3. the characteristics of the broiler industry in the 21 centrury.

METHODS AND PROCEDURES

This study was basically regional in scope focusing on the top five broiler producing states in the United States. The study utilized a modified, two round, Delphi technique. A panel of experts representing the broiler industry was selected through a nominating process. The nominating committee was selected by the researcher using representatives from the thirteen leading poultry companies in the United States, along with poultry leaders from extension, education, research, and state poultry associations. Thirty individuals were invited to participate in the study based on the frequency of nominations and their area of expertise related to the study. Twenty-four experts agreed to participate in the study by returning both rounds of the questionnaire (figure 1).

A structured Delphi instrument consisting of 76 items on a five point Likert-type scale was developed from current literature related to the broiler industry. A draft of 115 potential questionnaire items was developed and reduced to 95 which were included in a review draft. The 95 item review draft was reviewed by a panel of six persons who had expertise in the broiler/poultry field, futures research, and/or in education. The panel evaluated the items for importance and reviewed the instrument for content and face validity. Data collected in round one from the 76 item Delphi instrument, along with comments, were compiled and resubmitted to the panel of experts as a part of the round two instrument.

Data analysis for this study consisted of descriptive statistics including means, standard deviations, medians, and interquartile ranges. The Pearson product-moment correlation coefficients and the Wilcoxon matched-pairs signed-ranks test were used to measure stability between rounds. A composite score was calcuated for each item by taking the sum of the Likert scale score for all respondents.

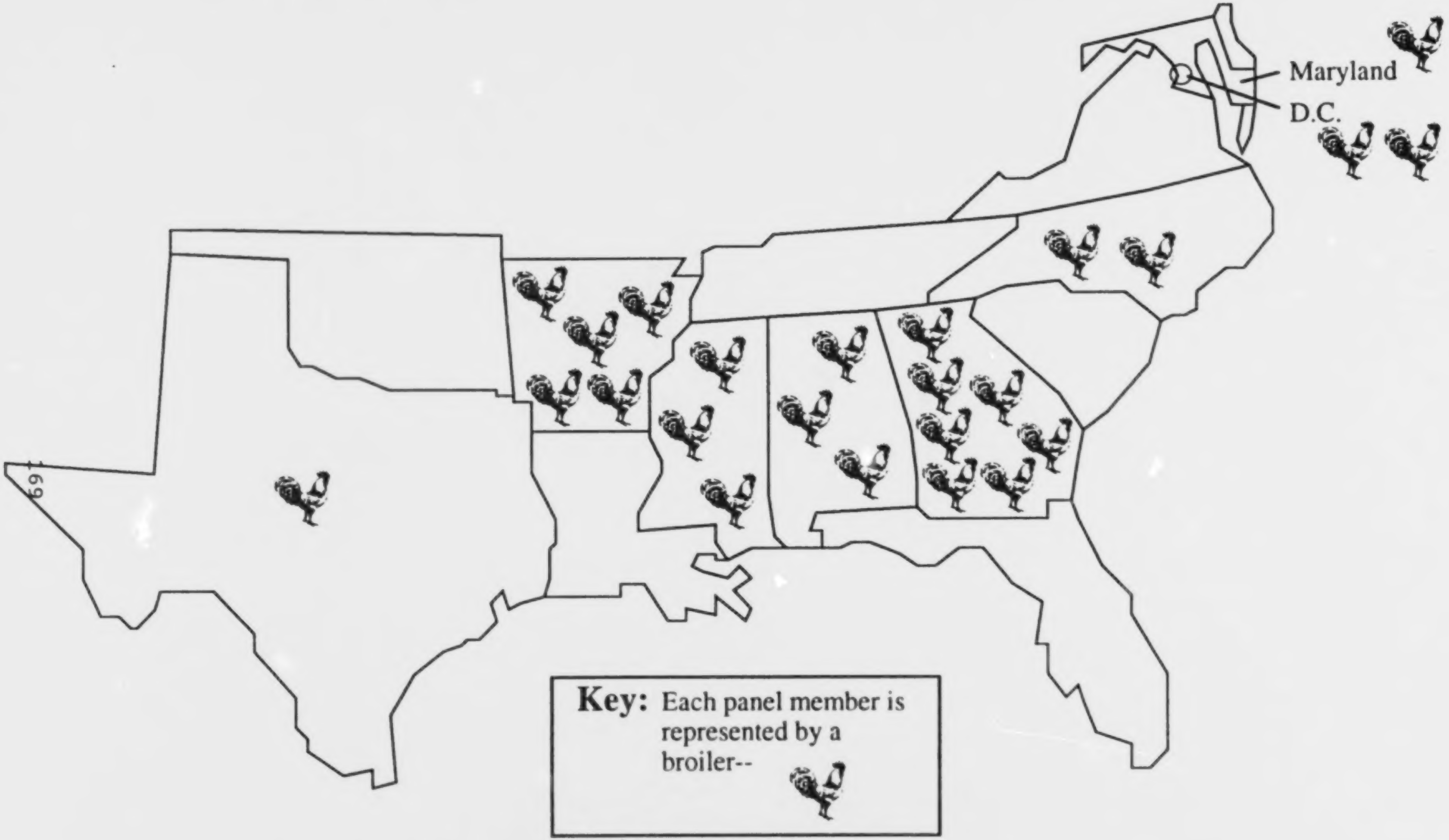
FINDINGS

Twenty-five experts responded to the first round of the instrument which included descriptive information relative to the experts. A summary of the data from all 25 first round respondents revealed that all 25 were males, ranging in age from 39 to 69 years. All 25 had college-level training with nine holding a degree related to poultry. The 25 respondents reported a total of 405 years in the broiler industry. The average experience for the group was 16.2 years. Positions held by the respondents included: company president and C.E.O., vice presidents, director of broiler operations, executive director, director of nutrition, area directr of production. Extension poultry science heads, professor/poultry science department head, professor/avian pathologist, poultry industry consultant, and director poultry market new.

Composite scores were calculated on round two data for each item and used to rank the items in order of agreement. The highest ranked items dealt with water quality, the design of broiler products for convenience and versatility, and the need for poultry science graduates to have courses in human relations. The lowest ranked items related to: the cage growing of broilers, the use of concrete floors, the center of broiler production emerging in the Midwest, larger size growing-out houses, and marketing strategies aimed at educating consumers on the processes of production.

Two criteria were used to determine if consensus had been met on each item by the panel of experts. Consensus was reached on an item if at least 63% (15 or more) of the respondents were in agreement and the answer fell within the "agree" or "disagree" range. Twenty-five items (33%) did not meet both criteria. Of the 51 items on which consensus was reached, 10 (13%) were in the disagree range and 41 (54%) were in the agree range.

The change in standard deviation and interquartile ranges from round one to round two indicated a move toward consensus for group answers. As measured by standard deviation, 94 percent of the items moved toward the mean, and 95 percent of the items moved toward the median as measured by the interquartile ranges. The responses were found to be stable (not significantly changed from round one to round two) in 75 (98%)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Key: Each panel member is represented by a broiler--

Figure 1. Locations of the Panel of Experts (N= 24)

of the items as indicated by the Pearson Product-moment correlation coefficient procedure and in 70 (92%) of the items as measured with the Wilcoxon matched-pairs signed-ranks test. These tests indicated that future rounds of the Delphi technique would be of little benefit.

CONCLUSIONS AND RECOMMENDATIONS

It was concluded that:

1. The Delphi technique may be effectively used to determine consensus among broiler industry experts on a range of topics.

2. The opinion leaders comprising the panel of broiler industry experts were representatives of business, education, research, and marketing promotion. The primary activity of the panel was related to management.

3. The broiler industry will continue to grow in production and processing with the total number of broiler companies dropping by approximately 25%. Scientific research along with better methods of production and processing will make poultry products a safer food source, but product safety will still be an important issue. Animal welfare will still be an issue to address. There will be fewer poultry science programs in Universities and Colleges, and graduates will also need courses in human relations. The predominant broiler production regions of the United States will remain in the South Atlantic and South Central regions even as urbanization of these areas increase. The industry will face issues concerning water quality, and costs for water and waste water treatment will increase. The average broiler production operation will increase in size with basically the same system of production being used. The larger sized broiler farms will lead to a labor shortage. The broiler grower will receive greater profits due to more favorable contract agreements. The disposal of broiler litter will remain a critical problem. Composting will be used to dispose of dead birds. The industry will still be faced with problems regarding employee health issues. Improvements will be made in broiler feed, with higher levels of quality control being used to cut feed costs. The feed conversion ratio will be further reduced. Genetic improvements in the chicken will occur in the immune system resulting in improved disease resistance. Marketing and sales forces will determine if breeding programs produce a heavier-breasted broiler. Broilers will be bred to produce less carcass fat.

4. The marketing of broiler meat will see exports nearly double, there will be an increased production of value-added products, non-refrigerated shelf-stable products, and the production of new dark meat products. Poultry products will be increasingly designed for convenience and versatility, using biodegradable packaging incorporating safety statements and guarantees. Market strategy will promote poultry as a preferred meat over beef and pork. New ideas to profitably market expanding production will include the tailoring of poultry products form start to finish to take advantage of specific world markets. The food service market will be the most important outlet for poultry products. The per capita consumption of broiler meat will steadily increase. Broiler companies will market nationally advertised and branded convenience goods. Chicken will replace beef and pork in many applications.

5. Most of the housing systems now in production will remain in production into the 21st century. As new houses go into production, there will be an increased use of computer controlled environmental and alarm systems. Computer systems will also be used to monitor feed usage. Ventilation systems will be based on ammonia level and temperature. More broiler houses will make use of evaporative cooling systems. The

size of broiler houses will remain basically the same and still make use of dirt floors.

It is recommended that:

1. The agricultural education program offer expanded and continued instruction relative to the broiler industry.

2. Inservice workshops for teachers should utilize broiler/poultry personnel.

3. The following content areas be included in the agricultural education program for secondary school students to prepare them for work in the broiler industry of the 21st century:

(1) Poultry genetics
(2) Poultry feeding
(3) Mathematics in broiler production
(4) Science in broiler production
(5) Career opportunities in broiler production
(6) Broiler industry organizations
(7) Effective communications
(8) Personal relations
(9) Problem solving
(10) Environmental protection
(11) Waste disposal
(12) Orientation to degree programs in broiler/poultry production
(13) Phases of vertical integration of the broiler industry
(14) State and federal regulations related to broiler production and marketing
(15) Computers in the broiler industry
(16) Promotion and advertising by broiler organizations and companies
(17) Agricultural mechanics skills such as: equipment adjustment and maintenance for broiler production equipment, installation of electrical systems, electrical controls, and environmental control systems.

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The Future of the Broiler Industry in the 21st Century with Implications for Agricultural Education

A Critique

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The researchers use the Delphi technique to reach consensus among poultry industry experts regarding future characteristics of the industry. I view this approach as being proactive and commend the researchers for their effort. The Delphi technique is an appropriate method for this type of research. The researchers used appropriate procedures and described them well. Also, the objectives were appropriate for the study. and the researchers were successful in completing the objectives of the study.

The study is regional in nature, with all participates located in the Southeastern United States. The paper said the top five broiler-producing states are the focus, however, the expert panel included members from outside these five states. The expert panel was adequately described, with an apparently excellent cross-section of members from industry and education. (The last sentence of the paragraph describing the expert panel was garbled.)

The findings section of the paper needs to be more extensive. If space was a concern, Figure 1--Locations of the Panel of Experts, should have been replaced with a table containing the items on which the panel reached consensus. The lack of an adequate findings section makes it appear that the conclusions were drawn and recommendations developed with no basis from the findings.

The conclusions drawn have implications for both secondary agricultural education and college poultry science programs. This dual-focus indicates that the panel members were not well-informed as to the specific nature of the study (a must with the Delphi technique) or that the researchers were reaching past the stated objectives of the study.

Although the limited findings make a critique of the recommendations difficult, one concern is that some of the curriculum content areas were not mentioned in the conclusions section. The areas may be and probably are appropriate, however, they were not justified earlier in the paper.

THE IMPORTANCE OF SELECTED MATHEMATICS CONCEPTS/SKILLS AND APPLICATIONS AS PERCEIVED BY MISSISSIPPI HIGH SCHOOL AGRISCIENCE AND MATHEMATICS TEACHERS FOR THE INTRODUCTION TO AGRISCIENCE CURRICULUM

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INTRODUCTION AND THEORETICAL FRAMEWORK

The integration of academic and vocational education is currently being stressed as a way to improve the capacity of the work force in the United States. Mathematics is frequently cited as an area needing considerable attention.

According to Hokanson (1984), production agriculture and its support industries produce a tremendous quantity of this country's gross national product. The increasing complexity of the technology used in the growing, processing, storage, and distribution of food and fiber coupled with international competition for markets makes it mandatory that workers in agriculture and in agricultural related occupations have skills in the analysis and solution of mathematical problems.

One goal of America 2000 is that students will exit grades 4, 8, and 12 competent in English, math, science, history, and geography. The need for math and science skills is felt in other areas of education as well. D'Augustine (1989) noted that rapidly changing requirements are placing new demands on the mathematics skills of students entering majors in business and vocational programs.

Mitchell (1990) added that employment situations typically require mathematics not taught in the current curricula. He has also noted that more skills in statistics, probability, logic, reasoning, percentage, measurement, geometry, algebra, and verbal items needed to be taught to students to better prepare them for future situations.

Hokanson (1984) has suggested that students traditionally have abhorred word problems. Therefore, they have gained little mastery in problem-solving techniques even though most of our real-life mathematical situations, whether in our personal or occupational lives, are the "story problem" type. He has suggested a blending of verbal skills with mathematical skills in the solution of "story problems." Many students know how math works, but not how to put it to use.

An alternate form of teaching mathematics has been suggested by Brown (1991). She made the point that, in today's mathematics classrooms, there are no real-life situations in which students can perceive and study skills or have the opportunity to see "the big picture" to solve everyday problems. Mathematical skills are learned when they are needed to solve meaningful, real problems.

Jacobs (1992) has noted that there is a trend to move toward interdisciplinary instruction. The simplest approach called "parallel teaching" leaves the disciplines intact, but realigns content within them so that related topics are taught concurrently. Interdisciplinary instruction mirrors the real world better than traditional instruction and offers a relatively easy way for teachers to begin linking the disciplines. The most sweeping approach is called "integrated" instruction where the disciplines are blended into thematic or problem-based pursuits.

Krogh (1992) has stated that interdisciplinary themes and projects capture students' interests, increasing their level of concentration. Sometimes students become interested in a particular theme and are more inclined to learn the subject matter. Units organized around a "real world" problem, theme, or project present new information in the context of everyday and practical applications.

Interdisciplinary instruction also helps to foster collaboration among the participating teachers. Wasley (1992) has suggested that one of our strongest detriments to the professional growth of our teachers is that they function in insolation. In integrated instruction, teachers work together as they align the topics they teach or develop units that cross disciplines. Teachers who work together tend to develop and recognize a new understanding of and respect for each other's discipline which results in a positive network within the school.

In 1991, 40 pilot programs in agriscience were initiated in Mississippi, using standardized curriculum guides. Science principles are well specified in the guides. Mathematics areas have not been included. This study involved agriculture and mathematics teachers in 20 schools with pilot agriscience programs. Introduction to Agriscience is a one-hour ninth or tenth grade class that provides an introduction to the science of agriculture. This is intended to serve as a foundation for additional classes.

PURPOSE AND OBJECTIVES

The purpose of this research was to determine the mathematics concepts/skills and applications which should be a part of the Introduction to Agriscience curriculum. The following specific research objectives are offered:

1. To determine the perceptions of high school agricultural educators on the importance of mathematics concepts/skills and applications which should be included in the Introduction to Agriscience curriculum.

2. To determine the perceptions of high school mathematics educators on the importance of mathematics concepts/skills and applications which should be included in the Introduction to Agriscience curriculum.

METHODOLOGY

An instrument was developed to collect information for the study. The instrument consisted of 32 selected mathematics concepts/skills and applications. Respondents were instructed to rate the items as to their importance in Introduction to Agriscience using a 5-point Likert scale as follows: (a) 1 = does not apply, (b) 2 = not important, (c) 3 = some importance, (d) 4 = important, and (e) 5 = essential. Content validity was established, using a panel of experts comprised of agricultural education faculty at Mississippi State University. The instrument was pilot-tested in agricultural education classes.

The population included 20 agriscience teachers and 20 mathematics teachers within schools participating in the Agrimath Integration Project. The instruments were mailed with a cover letter on December 4, 1992. A stamped, self-addressed, return envelope was included in the initial mail out. Non-respondents were sent a follow up reminder ten days following the mail out. All responses were due December 15, 1992. Afterwards, all remaining non-respondents were contacted by telephone. The final response included 18 agriscience teachers and 18 mathematics teachers, or a 90% total response rate.

Reliability was calculated using Cronbach's alpha and resulted in a .938 reliability coefficient.

Data analyses included the calculation of mean ratings and standard deviations for the mathematics concepts/skills and applications.

FINDINGS

All concepts/skills and applications were rated either important or essential. Overall the most important concepts/skills selected by both agriscience and mathematics teachers were (a) adding whole numbers (M = 4.89), (b) subtracting whole numbers (M = 4.89), (c) multiplying whole numbers (M = 4.89), (d) dividing whole numbers (M = 4.89), (e) reading a ruler (M = 4.86). The least important concepts/skills selected by both agriscience and mathematics teachers were (a) dividing fractions (M = 4.58), (b) multiplying fractions (M = 4.61), (c) adding fractions (M = 4.64), (d) subtracting fractions (M = 4.64).

For overall application, calculating percent (M = 4.56), calculating interest (M = 4.53), calculating profit margins (M = 4.50), calculating ratios and proportions (M = 4.50), and calculating the area of a square (M = 4.25) had the highest mean scores.

For overall application calculating the volume of a cone (M = 3.60), calculating cords (M = 3.60), calculating the volume of a sphere (M = 3.64), and calculating the area of a trapezoid (M = 3.67) had the lowest mean scores (see Table 1).

After analyzing the individual groups (agriscience teachers and mathematics teachers), the agriscience teachers perceived the concepts/skills of adding whole numbers (M = 4.89), subtracting whole numbers (M = 4.89), multiplying whole numbers (M = 4.89), dividing whole numbers (M = 4.89), and reading a ruler (M = 4.83) to be most important. This same group of agriscience teachers perceived calculating cords (M = 3.67), calculating the volume of a cone (M = 3.67), calculating the volume of a sphere (M = 3.78), and calculating the area of a trapezoid (M = 3.89) to be least important (see Table 2).

The mathematics teachers, while agreeing with the agriscience teachers that adding whole numbers, subtracting whole numbers, and multiplying whole numbers were most important, placed reading a ruler (M = 4.88) higher than dividing whole numbers (M = 4.83). Least important concepts/skills for mathematics teachers were adding, subtracting, multiplying, and dividing fractions (M = 4.61). Mathematics teachers found that applications of calculating the area of a trapezoid (M = 3.50), calculating the volume of a sphere (M = 3.50), calculating the volume of a cone (M = 3.53), and calculating cords (M = 3.53) were least important (see Table 3).

RECOMMENDATIONS

Based on the findings and conclusions of this study, and the related literature, the following recommendations were formulated:

> Instruction for students enrolled in Introduction to Agriscience should include certain mathematics concepts/skills and applications.

Agriculture and mathematics teachers are in relative agreement on the mathematics concepts/skills and applications which shuld be included in the Introduction to Agriscience instruction.

Efforts need to be made to enhance team teaching and instructional planning by agriculture and mathematics teachers.

Table 1
Totals, Means, and Standard Deviations of Mathematics Concepts/skills of Mathematics and Agriscience Teachers

Concepts/Skills	N	Mean*	S.D.
Adding whole numbers	36	4.89	0.32
Subtracting whole numbers	36	4.89	0.32
Multiplying whole numbers	36	4.89	0.32
Dividing whole numbers	36	4.86	0.35
Adding fractions	36	4.64	0.54
Subtracting fractions	36	4.64	0.54
Multiplying fractions	36	4.61	0.60
Dividing fractions	36	4.58	0.60
Adding decimals	36	4.75	0.50
Subtracting decimals	36	4.75	0.50
Multiplying decimals	36	4.75	0.50
Dividing decimals	36	4.75	0.50
Reading a ruler	36	4.86	0.36
Applications			
Calculating board feet	36	4.06	0.92
Converting metric to English	36	3.91	0.93
Converting English to metric	36	3.91	0.94
Calculating area of a square	36	4.25	0.77
Calculating area of rectangle	36	4.11	0.75
Calculating area of circle	36	3.94	0.87
Calculating area of trapezoid	36	3.67	0.98
Calculating area of triangle	36	3.86	0.90
Calculating volume of cylinder	36	3.97	0.91
Calculating volume of sphere	36	3.64	0.93
Calculating volume of cube	36	3.78	0.93
Calculating volume of cone	36	3.60	0.95
Calculating cords	36	3.60	1.00
Calculating flow rate	36	3.83	0.82
Calculating sprayer calibration	36	4.11	0.56
Calculating percentage	36	4.56	0.56
Calculating interest	36	4.53	0.56
Calculating ratios and proportion	36	4.25	0.65
Calculating profit margins	36	4.50	0.62

* Mean rating based on 5-point scale as follows: 1 = does not apply, 2 = not important, 3 = some importance, 4 = important, 5 = essential

Table 2
Totals, means, and standard deviation of mathematics concepts/skills of agriscience teachers.

Concepts/Skills	N	Mean *	S.D.
Adding whole numbers	18	4.89	0.32
Subtracting whole numbers	18	4.89	0.32
Multiplying whole numbers	18	4.89	0.32
Dividing whole numbers	18	4.89	0.32
Adding fractions	18	4.67	0.49
Subtracting fractions	18	4.68	0.49
Multiplying fractions	18	4.61	0.69
Dividing fractions	18	4.56	0.62
Adding decimals	18	4.72	0.46
Subtracting decimals	18	4.72	0.46
Multiplying decimals	18	4.72	0.46
Dividing decimals	18	4.72	0.46
Reading a ruler	18	4.83	0.38
Applications			
Calculating board feet	18	4.06	0.94
Converting metric to English	18	3.95	0.99
Converting English to metric	18	3.95	0.99
Calculating area of a square	18	4.17	0.79
Calculating area of rectangle	18	4.06	0.80
Calculating area of circle	18	4.00	0.84
Calculating area of trapezoid	18	3.89	0.90
Calculating area of triangle	18	4.07	0.73
Calculating volume of cylinder	18	4.06	0.73
Calculating volume of sphere	18	3.78	0.81
Calculating volume of cube	18	3.84	0.79
Calculating volume of cone	18	3.67	0.77
Calculating cords	18	3.67	0.77
Calculating flow rate	18	3.78	0.88
Calculating sprayer calibration	18	4.11	0.83
Calculating percentage	18	4.56	0.51
Calculating interest	18	4.56	0.51
Calculating ratios and proportion	18	4.11	0.76
Calculating profit margins	18	4.34	0.70

* Mean rating based on 5-point scale as follows: 1 = does not apply, 2 = not important, 3 = some importance, 4 = important, 5 = essential

Table 3
Totals, means, and standard deviation of mathematics concepts/skills of mathematics teachers.

Concepts/Skills	N	Mean *	S.D.
Adding whole numbers	18	4.89	0.32
Subtracting whole numbers	18	4.89	0.32
Multiplying whole numbers	18	4.89	0.32
Dividing whole numbers	18	4.83	0.39
Adding fractions	18	4.61	0.61
Subtracting fractions	18	4.61	0.61
Multiplying fractions	18	4.61	0.61
Dividing fractions	18	4.61	0.61
Adding decimals	18	4.78	0.55
Subtracting decimals	18	4.78	0.55
Multiplying decimals	18	4.78	0.55
Dividing decimals	18	4.78	0.55
Reading a ruler	18	4.88	0.33
Applications			
Calculating board feet	18	4.06	0.94
Converting metric to English	18	3.88	0.89
Converting English to metric	18	3.89	0.90
Calculating area of a square	18	4.33	0.77
Calculating area of rectangle	18	4.17	0.71
Calculating area of circle	18	3.89	0.93
Calculating area of trapezoid	18	3.50	1.04
Calculating area of triangle	18	3.67	1.03
Calculating volume of cylinder	18	3.89	1.08
Calculating volume of sphere	18	3.50	1.04
Calculating volume of cube	18	3.72	1.07
Calculating volume of cone	18	3.53	1.13
Calculating cords	18	3.53	1.18
Calculating flow rate	18	3.88	0.78
Calculating sprayer calibration	18	4.12	0.73
Calculating percentage	18	4.56	0.62
Calculating interest	18	4.50	0.62
Calculating ratios and proportion	18	4.39	0.50
Calculating profit margins	18	4.61	0.50

* Mean rating based on 5-point scale as follows: 1 = does not apply, 2 = not important, 3 = some importance, 4 = important, 5 = essential

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THE IMPORTANCE OF SELECTED MATHEMATICS CONCEPTS/SKILLS AND APPLICATIONS AS PERCEIVED BY MISSISSIPPI HIGH SCHOOL AGRISCIENCE AND MATHEMATICS TEACHERS FOR THE INTRODUCTION TO AGRISCIENCE CURRICULUM

A Critique

Robert Terry, Jr., Texas Tech University -- Discussant

This study focuses upon the development of interdisciplinary instruction programs. For the past five years, agricultural educators have discussed the importance and merits of agricultural literacy -- an interdisciplinary instruction program. While most of our research and strategies for change have emphasized taking agriculture to other disciplines, this study identifies ways to bring other disciplines in to agriculture.

The introduction established a strong foundation for the research and presents the research problem clearly. The interrelationship between mathematics and agricultural concepts were established and the concepts of interdisciplinary instruction was outlined. The purpose and objectives were stated clearly and concisely.

The methodology discussed was sound. The paper contained detailed information about the instrument and its development. A panel of experts and a pilot test were used to establish the validity of the instrument. The follow-up procedures, response rate (90%), and reliability (Chronbach's alpha of .938) were impressive.

There are some questions about the sampling procedure. How were the 20 agriculture teachers and 20 mathematics teachers selected? Also, with such a small population, why not include all of the appropriate teachers from each of the schools in the pilot program?

The authors organized the narrative report very well. The concepts that received the highest and lowest ratings are listed for the entire group of respondents and then for the agriculture teachers and mathematics teachers separately.

Some differences were found between the views of agriculture teachers and math teachers. Are those differences significant? An important finding is overlooked. Both groups of teachers listed every mathematics concept/skill and application well above the mid-point of the five point Likert scale -- the lowest items had means of 3.50. Apparently all of these concept/skills and applications are "important."

No conclusions are listed. Considering the paper did not "fill" the allocated space, some conclusions could have been presented about the data.

The recommendations are somewhat vague. The first recommendation states that "Introduction to Agriscience should include certain mathematics concept/skills and applications." Specifically, which ones should be included? Are there any that should be excluded?

The final recommendation suggested that agriculture and mathematics teachers should work to enhance team teaching and instructional planning. This statement does not have any foundation in the results. Perhaps an objective should have been added to investigate the teachers' views on this matter.

INSERVICE EDUCATION NEEDS OF TEACHERS OF PILOT AGRISCIENCE COURSES IN MISSISSIPPI

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INTRODUCTION AND THEORETICAL FRAMEWORK

Teachers of agriculture continually want and need inservice education, particularly in technical subject matter (Barrick, Ladewig, and Hedges, 1983). This need is more pronounced when the teachers are asked to teach new subject matter or subject matter in which they have little previous training.

In developing an inservice education program, assessing learner needs is an important early step in the process. Involving the learners in the process of planning an inservice education program increases the likelihood of implementing relevant programs (Waters and Haskell, 1989).

Tyler (1971) defined a need as a difference between a present condition and an acceptable norm. This definition serves as the basis for the discrepancy model of assessing learner needs. One discrepancy model, developed by Borich (1980), is commonly used in educational settings and is appropriate for assessing inservice education needs of teachers (Barrick et al., 1983). In this study, the researchers used the Borich model to assess the inservice education needs of teachers of pilot agriscience courses in Mississippi. Background information about the pilot courses and a discussion of the appropriateness of the Borich model for assessing inservice education needs is provided below.

Background

In 1988, the National Research Council (NRC) reported that "much of the focus and content of many vocational agriculture programs is outdated" (p. 3). The NRC recommended that agricultural educators move quickly to upgrade the scientific and technical content of the curriculum.

Mississippi agricultural educators responded to this recommendation by developing two pilot courses in agriscience for the 1991-92 school year. One course, Introduction to Agriscience, was designed as a one-hour, 9th and 10th grade level course. The other, Agriscience I, was designed as a two-hour, 11th and 12th grade level course. A third course, Agriscience II, was implemented during the 1992-93 school year. In a report on the development of the courses, Johnson (1991) stated, "The courses were designed to teach the scientific principles which form the basis of the modern food and fiber industry and to provide students with active, hands-on learning experiences which emphasize the scientific method in the study of agriculture" (p. 1).

Forty-one schools (with 42 agriculture teachers) were selected to serve as test sites for the pilot courses. All of the selected teachers attended a two-week, inservice workshop in June 1991.

During the first year of the pilot test, the courses were well-received. Agriculture teachers, school administrators, guidance counselors, and science teachers all strongly support the courses and agree that science credit should be awarded for the course (Johnson & Newman, 1992; Newman & Johnson, 1992).

The Borich Model of Needs Assessment

Using the Borich model results in a framework for practical decision making. Barrick et al. (1983) concluded that the Borich model is a defensible method of assessment of teacher inservice education needs--better "than a survey of desires or felt needs" (p. 19). The Borich model's use of weighted discrepancy scores to determine needs of learners usually yields results that are different from those that would be obtained by more traditional means of needs assessment or from those identified by using the importance ratings (Barrick et al., 1983; Barrick & Powell, 1985; Waters & Haskell, 1989).

In the Borich model, the teachers surveyed provide an evaluative judgement about the importance of competencies and their own performance in these areas (Borich, 1980). The attempt of the design is to determine the "congruence between what the teacher should be able to do and what the teacher can do" (Borich, 1980, p. 42).

PURPOSE AND OBJECTIVES

The overall purpose of this research was to identify and assess the inservice education needs of teachers who teach the pilot agriscience courses in Mississippi and to determine their need for additional instructional materials. The effect of the study would be to plan and implement an inservice education program to help meet these needs. The specific objectives of the study were to:

1. determine the teachers' perceptions of the importance of the various units taught in the courses and their personal level of competence in each unit;

2. determine the need for inservice education on the agriscience units based on the Borich model of assessing needs; and

3. determine the units for which teachers perceive additional instructional materials are needed.

METHODS AND PROCEDURES

The design of the study was descriptive-survey. The population for the study was 39 teachers of pilot agriscience courses in Mississippi. Three of the original teachers in the pilot program were excluded because of resignations and retirements and replacements had not yet been put in place.

A mailed questionnaire was used to collect the data. Questionnaires were mailed to the 39 teachers in October, 1992. Questionnaires were mailed with a stamped, self-addressed, return envelope. One follow-up mailing was conducted 10 days after the original mailing. Thirty-one of the 39 teachers returned questionnaires for a response rate of 79.5%. Two responses were deemed to be unusable because of response rate and incomplete data, resulting in a useable response rate of 74%.

Chi-square tests used to compare early and late respondents on their ratings of the units on importance and competence to determine if a possible nonresponse bias existed were not significant. The researchers concluded that nonresponse bias was not a threat to the study (Miller & Smith, 1983).

Instrumentation

The instrument used for the study was designed by the researchers. As the competency areas to be rated, it contained the 40 units taught in the three pilot agriscience courses, with the mandatory objectives for each unit listed to further clarify the subject matter within each unit. The instrument was reviewed by a panel of experts consisting of agricultural education faculty and graduate students to establish content validity.

A pilot test was conducted with seven preservice agricultural education teachers for the purpose of establishing test-retest reliability (coefficient of stability). The students were asked to complete the questionnaire and then asked to complete it again after 14 days. Based on the procedures outlined by Ferguson (1976), Pearson product-moment correlations for each competency were calculated and standardized by converting them to Fisher's Z scores. Then a mean Fisher's Z score was computed and converted to a Pearson product-moment correlation for the overall reliability score. The coefficient of stability for the instrument was .76.

FINDINGS

Objective 1

The teachers were asked to rate the importance of the units and their level of competence in the subject matter contained in each unit in the courses which they were currently teaching. Twenty-nine teachers rated the competencies in the Introduction to Agriscience. For the Agriscience I course, 14 teachers rated the competencies. For the Agriscience II course, 7 teachers rated the competencies. (Several of the teachers were teaching two or all three courses.) The competency ratings and importance ratings are summarized in Table 1.

Objective 2

Weighted discrepancy scores were calculated for each respondent for each of the units by subtracting the competence rating from the importance rating and multiplying the result by the importance rating (Borich, 1980).

Mean weighted discrepancy scores were calculated for each unit by dividing the sum of the weighted discrepancy scores for the unit by the number of observations (Borich, 1980). These scores ranged from -2.87 to 9.00.

For Introduction to Agriscience and Agriscience I, the biotechnology, computer technology, and mechanical technology units, in order, had the highest mean weighted discrepancy scores. For Agriscience II, the top three units were environmental technology, aquaculture, and physical technology. The mean weighted discrepancy scores and standard deviations are presented by agriscience course in Table 2.

Objective 3

Teachers were also asked if additional instructional materials were needed for each unit. In Introduction to Agriscience, more teachers perceived computer technology (100.0%) and mechanical technology (96.6%) to be in need of additional materials. In Agriscience I, biotechnology (100.0%) was highest, followed by computers (92.9%) and mechanical technology (92.9%). In Agriscience II, environmental technology, aquaculture, physical technology, and food and fiber science all had 100% of the teachers reporting a need for more materials.

CONCLUSIONS AND RECOMMENDATIONS

Because the lowest mean importance rating for an item was 3.71 and the lowest mean competence rating for an item was 2.71, it appears that teachers of the pilot agriscience courses think the units in the three courses are important and consider themselves competent in most of the units.

Although the need for inservice education is not exceptionally high (probably due to the teachers having participated in a workshop designed to prepare them to teach the courses in Summer 1991) the model did consistently identify units where the level of competence was not on a par with the level of importance of the unit. The three most pressing needs for inservice education appear to be in the areas of biotechnology, computers, and mechanical/physical technology. These units were rated highly in all three courses. Deficiencies were also identified in the areas of entomology, environmental sciences, and application of the scientific method. Teachers of the two advanced courses also need instruction in aquaculture and plant science.

The teachers perceive a dearth of instructional materials for the units included in the course, especially in computers, biotechnology, mechanical technology, environmental sciences, aquaculture, and entomology. Teachers perceive that more instructional materials are available for the more traditional units such as human relations/leadership, animal science, plant science, supervised agricultural experience, and soil science; but, for most units, teachers still felt they needed more instructional materials.

Table 1

Teacher Perceptions of Importance of and Personal Competence in Units from Agriscience Courses

	Competence		Importance	
Course/Unit	$\bar{X}$	SD	$\bar{X}$	SD
Introduction to Agriscience				
Human Relations/Leadership	4.40	.72	4.04	1.14
Principles of Animal Science	4.33	.71	4.07	1.15
Principles of Plant Science	4.30	.70	4.18	1.06
Principles of Soil Science	4.17	.70	4.11	.99
Introduction to Agriscience	4.10	.80	4.03	1.04
Supervised Agricultural Experience	4.10	.76	3.82	1.25
Opportunities in Agriscience	4.00	.70	4.04	1.04
Principles of Food and Fiber Science	3.63	.81	3.89	1.03
Issues in Environmental Quality	3.63	.85	4.07	1.05
Principles of Entomology	3.57	.90	3.93	.94
Computers	3.50	1.08	4.17	1.10
Application of the Scientific Method	3.40	.86	3.89	1.10
Mechanical Technology	3.40	.89	4.04	1.08
Introduction to Biotechnology	3.03	.88	4.00	1.04
Agriscience I				
Soil Science Technology	4.21	.70	4.39	.51
Animal Science Technology	4.14	1.10	4.31	.95
Human Relations/Leadership	4.14	.54	4.00	.91
Plant Science Technology	4.07	.92	4.39	.65
Introduction to Agriscience	3.93	.83	3.93	.49
Supervised Agricultural Experience	3.93	.92	3.77	1.09
Application of the Scientific Method	3.79	.80	4.23	.44
Principles of Fiber Science	3.71	.99	3.77	1.01
Natural Resource Technology	3.71	.99	4.15	.80
Computers	3.64	.84	4.31	.63
Principles of Entomology	3.57	1.02	4.23	.44
Opportunities in Agriscience	3.56	.73	4.25	.71
Mechanical Technology	3.36	1.08	4.15	.38
Biotechnology	3.07	1.00	4.39	.71
Agriscience II				
Soil Science Technology	4.43	.54	4.83	.41
Communication Skills	4.29	.49	4.67	.52
Plant Science Technology	3.86	1.07	4.83	.41
Supervised Agricultural Experience	3.67	1.03	3.71	1.38
Mechanical Technology	3.50	1.22	4.20	.45
Entomology	3.29	.76	4.33	.52
Food and Fiber Industry	3.29	1.11	4.00	1.55
Environmental Technology	3.29	1.25	4.83	.41
Entrepreneurship	3.17	.75	4.00	.58
Aquaculture	3.00	.89	4.57	.54
Computer Usage	3.00	.63	4.00	1.41
Physical Technology	2.71	.95	4.33	.82

Table 2

Mean Weighted Discrepancy Scores for Units of Agriscience Courses

Course/Unit	$\bar{X}$	SD
Introduction to Agriscience		
Introduction to Biotechnology	5.069	5.418
Mechanical Technology	3.615	4.834
Computers	3.464	.943
Issues in Environmental Quality	3.036	4.765
Application of the Scientific Method	2.786	4.077
Principles of Entomology	2.393	4.012
Principles of Food & Fiber Science	2.036	3.437
Opportunities in Agriscience	1.036	3.249
Principles of Soil Science	.821	3.518
Principles of Plant Science	.607	3.900
Introduction to Agriscience	.357	3.153
Supervised Agricultural Experience	.176	3.312
Principles of Animal Science	.036	3.097
Human Relations/Leadership	-.286	3.740
Agriscience I		
Biotechnology	6.538	6.540
Mechanical Technology	3.769	5.747
Computers	3.692	4.889
Opportunities in Agriscience	3.500	3.780
Principles of Entomology	3.385	4.501
Application of the Scientific Method	2.231	4.764
Plant Science Technology	2.154	5.047
Natural Resource Technology	2.077	3.883
Principles of Fiber Science	1.000	4.203
Animal Science Technology	.846	3.671
Soil Science Technology	.846	3.693
Supervised Agricultural Experience	.769	5.069
Human Relations/Leadership	.077	3.818
Introduction to Agriscience	.077	3.174
Agriscience II		
Environmental Technology	9.000	6.000
Aquaculture	8.167	6.178
Physical Technology	8.167	4.309
Computer Usage	6.000	5.831
Entomology	5.333	5.046
Plant Science Technology	5.000	6.325
Mechanical Technology	4.200	4.025
Food & Fiber Industry	4.000	3.742
Entrepreneurship	3.500	3.674
Communication Skills	2.500	2.739
Supervised Agricultural Experience	2.000	6.481
Soil Science Technology	1.667	2.582

Table 3

Teacher Perceptions of Need for Additional Instructional Materials for Agriscience Units

	Additional Materials Needed?	
Course/Units	Frequency Yes	% Yes
Introduction to Agriscience		
Computers	29	100.0
Mechanical Technology	28	96.6
Application of the Scientific Method	25	86.2
Issues in Environmental Quality	24	82.8
Principles of Entomology	24	82.8
Principles of Food & Fiber Science	24	82.8
Principles of Plant Science	22	75.9
Opportunities in Agriscience	20	69.0
Principles of Soil Science	17	58.6
Principles of Animal Science	17	58.6
Human Relations/Leadership	16	55.2
Introduction to Biotechnology	13	44.8
Introduction to Agriscience	13	44.8
Supervised Agricultural Experience	13	44.8
Agriscience I		
Biotechnology	14	100.0
Mechanical Technology	13	92.9
Computers	13	92.9
Principles of Entomology	12	85.7
Application of the Scientific Method	11	78.6
Natural Resource Technology	11	78.6
Plant Science Technology	10	71.4
Principles of Fiber Science	10	71.4
Introduction to Agriscience	10	71.4
Animal Science Technology	10	71.4
Opportunities in Agriscience	9	64.3
Soil Science Technology	9	64.3
Supervised Agricultural Experience	8	57.1
Human Relations/Leadership	7	50.0
Agriscience II		
Environmental Technology	7	100.0
Aquaculture	7	100.0
Physical Technology	7	100.0
Food & Fiber Industry	7	100.0
Entomology	6	85.7
Plant Science Technology	6	85.7
Entrepreneurship	6	85.7
Mechanical Technology	6	85.7
Soil Science Technology	6	85.7
Computer Usage	5	71.4
Supervised Agricultural Experience	4	57.1
Communication Skills	3	42.9

Rankings of the units based on the mean weighted discrepancy scores appear to be quite different from rankings of the units based on either importance or competence. This supports the conclusions reached by Barrick et al. (1983) and Waters and Haskell (1989).

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INSERVICE EDUCATION NEEDS OF TEACHERS OF PILOT AGRISCIENCE COURSES IN MISSISSIPPI

A Critique

Carey L. Ford, Tennessee State University - - Discussant

The authors should be commended for conducting research on a significant topic facing agricultural education across the country. Much attention has being centered around improving the quality of instruction and the agricultural education curriculum. The authors attempted to identify and assess the inservice education needs of teachers who participated in the pilot agriscience courses in Mississippi. They also attempted to determine their need for additional education materials.

The authors developed a strong theoretical framework for this study. Objectives were clearly stated and the research procedures were sound. A mailed questionnaire was used for data collection. The survey instrument was reviewed for content validity and a pilot was used for testing reliability. The reliability coefficient was .76 which is good, but probably should have been a little higher.

The results were easy to understand and clearly written. The conclusions and recommendations were supported by the findings. Again, I commend the authors for addressing a significant problem in a professional manner.

In reviewing the study, the following questions were proposed to the authors for consideration:

1. Based on your conclusions, do you feel that most of the agricultural teachers in Mississippi are competent in the units?
2. Were there any incentives provided for the agricultural teachers to participate in this program?
3. Are other teacher interested teaching these agriscience courses?

LONGITUDINAL STUDY OF UNDERGRADUATE AGRICULTURE MAJORS: 1977, 1982, 1987 AND 1992

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INTRODUCTION AND THEORETICAL FRAMEWORK

American agriculture faces a potentially severe human capital shortage. Annually, there are approximately 48,000 new openings for food, agriculture, and natural resource graduates; however, only slightly more than 43,500 qualified graduates are available to fill these positions (Coulter, Goecker, and Stanton, 1990). Thus, the demand for graduates with expertise in the agricultural sciences is predicted to exceed the supply by about 11% through 1995.

Data collected from colleges of agriculture which are members of the National Association of State Universities and Land Grant Colleges (NASULGC) indicated a 28% enrollment decline from 1980 to 1989 Litzenberger et al, 1991. Pescatore and Harter-Dennis (1987) attributed the decline to two factors: a decline in the college-age population and the failure of agriculture to compete with other professions in attracting students.

Much research has been done in search of ways to more efficiently and effectively recruit students. The focus of much of this research has been to identify characteristics of students pursuing majors in agriculture and determine factors or individuals which influence choice of major. Recruitment strategies are then developed to capitalize on of the identified characteristics and factors.

Studies by Christmas (1989), Taylor (1987), Slocombe (1986), Bowen and Lee (1984) and Dunkleberger, et al. (1982) found that family members, especially parents, had the most influence on choice of major. Research by Jackman and Smick-Attisano (1991) indicated that choice of major was influenced by the quality and reputation of the programs. Slocombe (1986) found that recruitment literature, friends, university students, campus visitation and the high school agriculture teacher influenced the decision to enroll in the college of agriculture and that extension personnel, university literature, friends and campus visitation influenced choice of major.

An initial profile of undergraduate students enrolled in agriculture majors at Mississippi State University (MSU) was compiled in 1977 using data extracted from the 1977 USDA/CSRS regional project, S-114 (Parent, 1979; Howell and Parent 1979). Bowen and Lee replicated the study in 1982 using only MSU students enrolled in agriculture majors and Taylor replicated the study in 1987. Data collected in each replication were compared to identify trends that may have developed for college of agriculture majors during the 10 year period since 1977.

Trends appeared to be developing in terms of an increase in the percentage of students from urban areas and those who enroll in high school agriculture courses. Parents of students in agriculture majors continued to have the most influence on their children regarding choice of major and students continued to select majors that will prepare them for careers and lead to desired lifestyles. Bowen and Lee (1984) and Taylor (1989) suggested that recruitment efforts focus on urban as well as rural area students and not be limited to those students enrolled in high school agriculture courses. It was also recommended that parents of prospective students be included in the recruitment process.

PURPOSE AND OBJECTIVES

The purpose of this study was to describe trends that may have developed over a 15 year period for college of agriculture majors. Objectives of the study were to: (1) describe the characteristics of undergraduate students enrolled in agriculture majors in the College of Agriculture and Home Economics at Mississippi State University in 1992; (2) compare the characteristics of students enrolled in the College of Agriculture and Home Economics at Mississippi State University in 1977, 1982 and 1987 to those students enrolled in 1992; and (3) identify enrollment trends that may have developed over a 15 year period.

METHODS AND PROCEDURES

Design and instrumentation for this study were the same as those for 1977, 1982 and 1987 studies. Data collection procedures were similar to those used in 1982 and 1987. A list of all undergraduates enrolled in the College of Agriculture and Home Economics in the Fall of 1992 was obtained. Sex of student, class, ACT score, high school grade point average (GAP), MSU GPA, cumulative GPA and transfer GPA were included on the list. A stratified random sample of 355 students was selected. Stratification was based on major. A faculty or staff contact for each major was identified and asked to deliver and collect the instruments from the student. After three weeks, contact persons were asked to encourage students who had not responded to do so as soon as possible. Additional students were randomly selected to replace those who could not be located or who were not enrolled in an on campus class. Contacts were able to deliver 295 of the 355 instruments.

A total of 170 responses were obtain from the assessable population for a response rate of 57.6%. Students who did not respond were compared on five variables: high school GPA, college GPA, classification, ACT scores and sex. No differences were found between the two groups on any of the variables.

FINDINGS

Mean student age for the four years showed a gradual increase from 20.9 years in 1977 to 21.0 in 1982 to 21.3 in 1987 to 23.2 in 1992. The percentage of females pursuing agriculture majors has remained relatively constant since 1982. The largest (5%) increase in the percentage of females pursuing agriculture majors took place from 1977 and 1982. There was a 2% increase in females between 1987 and 1992. Figures for all four samples are presented in Table 1.

Table 2 shows that the percentage of seniors comprising the four samples taken over the 15 year period has increased 18% between 1977 and 1992. Sophomores in the samples have steadily declined from 22% in 1977 to 12% in 1992. The percentage of juniors increased by 2 in the 1992 sample when compared to the sample taken in 1987. During the 10 year period from 1977 to 1987, samples showed a continuous decline in the percentage of juniors. After a 1% increase from 1977 and 1982, the percentage of freshmen has continued to drop. Freshman comprised 15% of the 1982 sample, 11% in 1987 and 7% in 1992.

Table 1

Gender of Agriculture Students in the College of Agriculture and Home Economics in 1977, 1982, 1987, and 1992.

GENDER	1977		1982		1987		1992	
	n	%	n	%	n	%	n	%
Male	106	80.9	175	76.4	145	78.4	130	76.5
Female	25	19.1	54	23.6	40	21.6	40	23.5
Total	131	100.0	229	100.0	185	100.0	170	100.0

Table 2

Classification of Agriculture Students in the College of Agriculture and Home Economics in 1977, 1982, 1987, and 1992

CLASS	1977		1982		1987		1992	
	n	%	n	%	n	%	n	%
Freshman	18	13.5	34	15.0	20	10.8	12	7.1
Sophomore	29	22.3	43	18.9	30	16.2	20	11.8
Junior	41	31.6	66	29.1	49	26.5	49	28.8
Senior	42	32.3	84	37.0	82	44.3	85	50.0
(Missing)	(1)	-	(2)	-	(4)	-	(4)	-
Total	131	100.0	229	100.0	185	100.0	170	100.0

A notable decline was observed in the percentage of students in the 1992 sample from urban areas when compared to students in the 1977, 1982, and 1987 samples as shown in Table 3. While increasing from 38% in 1977 to 43% in 1982 and further to 55% in 1987, this figure dropped to 29% in 1992. Rural, non-farm students increased substantially from 14% in 1987 to 35% in 1992. This figure had declined slightly between 1977 and 1982 and substantially between 1982 and 1987. The percentage of students from farms has remained constant at about 30% since 1982. In 1977, 35% of the samples were from farms.

Married undergraduates pursuing agriculture majors remained virtually unchanged in the 1992 sample when compared to students in the 1987 sample. That figure had increased by 4 percent between 1982 and 1987 and decreased by 9% between 1977 and 1982.

The percentage of students enrolled in agriculture majors who had graduated from a public high school rose by 18% between 1982 and 1992 with the greatest (15%) increase taking place between 1987 and 1992. Data in Table 4 also show that the percentage of students who graduated from private, non-religious high schools decreased 15% between 1987 and 1992.

Table 3

Residence Status of Agriculture Students in the College of Agriculture and Home Economics in 1977, 1982, 1987, and 1992

RESIDENCE	1977		1982		1987		1992	
	n	%	n	%	n	%	n	%
Urban (Towns > 10,000)	51	37.6	98	42.8	101	54.5	58	29.3
Rural, Non-farm	35	27.2	59	25.8	26	14.1	60	35.3
Rural, Farm	44	35.2	72	31.4	57	30.8	51	30.0
(Missing)	(1)	-	-	-	(1)	-	(1)	-
Total	131	100.0	229	100.0	185	100.0	170	100.0

Table 4

Type of High School Attended by Students Enrolled in the College of Agriculture and Home Economics in 1977, 1982, 1987, and 1992

TYPE OF SCHOOL	1977		1982		1987		1992	
	n	%	n	%	n	%	n	%
Public	88	68.2	130	57.0	111	60.0	128	75.3
Private, Religious	9	7.0	20	8.8	13	7.0	15	8.8
Private, Non-Religious	32	24.8	78	34.2	55	29.7	26	15.3
(Missing)	(2)	-	(1)	-	(6)	-	(1)	-
Total	131	100.0	229	100.0	185	100.0	170	100.0

For students in the 1992 study, 34% came directly to MSU after high school, 49% transferred from 2-year colleges and 16% transferred from 4-year colleges. Forty-three percent of the students in 1987 study had come directly to MSU and 42% transferred from 2-year colleges. In both 1977 and 1982, 49% of agriculture majors had come directly to MSU after high school. Thirty-eight percent of the 1977 sample and 40% in the one in 1982 were transfers from 2-year colleges.

The data in Table 5 reveals that 74% of the undergraduate agriculture majors in the 1992 sample had not enrolled in agriculture courses while in high school. This is an increase of 4% when compared to the students in the 1987 study who had not taken high school agriculture courses. This figure had dropped during the 10 year period from 1977 to 1987. In 1977, 77% of the students had not taken high school agriculture, and 76% had not in 1982, and 70% had not in 1987. For agricultural education majors, the percentage of students who had taken agriculture in high school rose from 63% in 1987 to 78% in 1992. There was a decrease in this figure between 1982 when it was 65% and 1987.

Table 5

Students Enrolled in the College of Agriculture and Home Economics in 1977, 1982, 1987 and 1992 Who Took Vocational Agriculture Classes in High School

AGRICULTURAL CLASSES TAKEN	1977 n	1977 %	1982 n	1982 %	1987 n	1987 %	1992 n	1992 %
Yes	29	22.7	56	24.5	55	29.7	44	25.9
No	99	77.3	173	75.5	130	70.3	126	74.1
(Missing)	(3)	-	-	-	-	-	-	74.1
Total	131	100.0	229	100.0	185	100.0	170	100.0

Students in all four samples had a variety of work experiences. The data presented in Table 6 show that 49% of 1992 students sample had home farm work experience. This was a substantial decrease from each of the previous samples which had held relatively constant at 60%. Non-agricultural work experience had been obtained by large percentages of students in all four samples. Almost 90% of the students in both 1977 and 1982 had worked in non-agricultural jobs; however, this dropped to 78% in 1987, but rose slightly to 82% for students in the 1992 sample.

Table 6

Work Experience of College of Agriculture and Home Economics Students in 1977, 1982, 1987 and 1992

WORK EXPERIENCE	1977 n	1977 %Yes	1982 n	1982 %Yes	1987 n	1987 %Yes	1992 n	1992 %Yes
Home farm experience	75	61.5	141	66.8	109	58.9	84	49.4
Other farm employee	53	48.2	113	54.1	87	47.0	84	49.4
Other work experience	110	89.4	177	88.1	144	77.8	139	81.8

Fathers were, as with the previous three samples, rated by students in the 1992 sample as having the greatest influence on choice of college major and mothers were again rated second. College teachers/advisors and college friends continued to be influential regarding choice of major. The ranking of these four individuals, as shown in Table 7, has remained the same since 1977.

Career preparation continued to be rated by students as the most important factor in choice of college major followed by desired lifestyle. A notable change occurred in the 1992 data in that high school counselor ranked sixth among the factors after being rated the least or nearly the least most important factor in choice of college major in the previous 3 samples. Table 8 contains the data on importance of factors to choice of college major.

Table 7

Individuals Influencing Choice of Major for College of Agriculture and Home Economics Students Included in 1977, 1982, and 1987 Samples

INDIVIDUAL	1977 (n=131)			1982 (n=229)			1987 (n=185)			1992 (n=170)		
OF INFLUENCE	$\bar{x}$	SD	RANK	$\bar{x}$	SD	RANK	$\bar{x}$	SD	RANK	$\bar{x}$	SD	RANK
Father	2.06	.79	1	2.11	.77	1	1.93	.77	1	1.95	.79	1
Mother	1.82	.67	2	1.87	.69	2	1.86	.69	2	1.85	.72	2
College teacher/advisor	1.61	.79	3	1.50	.69	3	1.62	.72	3	1.76	.84	3
College friend	1.44	.62	4	1.47	.65	4	1.55	.71	4	1.62	.77	4
Brother	1.42	.63	5	1.37	.64	6	1.25	.53	11	1.33	.62	8
Veterinarian	1.37	.74	6	1.28	.61	8	1.28	.59	9	1.29	.63	10
H. S. friend	1.33	.63	7	1.32	.57	7	1.29	.55	8	1.42	.66	6
Former student	1.32	.63	8	1.43	.65	5	1.36	.61	6	1.49	.75	5
Sister	1.30	.52	9	1.24	.55	11	1.24	.51	12	1.28	.60	12
Other teacher/principal	1.26	.51	10	1.26	.51	9	1.30	.57	7	1.30	.58	9
H. S. counselor	1.21	.46	11	1.21	.49	13	1.51	.42	5	1.28	.59	12
Vo-Ag teacher	1.18	.53	12	1.25	.61	10	1.27	.57	10	1.35	.69	7
Extension agent	1.16	.43	13	1.22	.54	12	1.21	.49	13	1.19	.49	13

Rating Scale: 1=No Influence, 2=Some Influence, 3=Very Influential

Table 8

Importance of Selected Factors on Choice of Major by College of Agriculture and Home Economics Students in 1977, 1982, and 1987

INDIVIDUAL	1977 (n=131)			1982 (n=229)			1987 (n=185)			1992 (n=170)		
OF INFLUENCE	$\bar{x}$	SD	RANK	$\bar{x}$	SD	RANK	$\bar{x}$	SD	RANK	$\bar{x}$	SD	RANK
Career preparation	2.66	.64	1	2.76	.49	1	2.60	.65	1	2.75	.54	1
Style of life	2.18	.84	2	2.13	.83	2	2.06	.85	2	2.11	.82	2
Prior ag experience	1.94	.86	3	1.90	.84	4	1.85	.86	5	1.89	.85	4
Good income	1.91	.74	4	1.77	.72	5	1.88	.71	4	1.84	.70	5
Help others	1.90	.77	5	1.95	.75	3	1.90	.79	3	2.00	.72	3
College courses	1.43	.72	6	1.37	.66	6	1.40	.69	6	1.43	.69	8
College teacher/ advisor	1.34	.63	8	1.32	.58	8	1.29	.57	9	1.35	.63	10
Scholarships/ financial aid	1.34	.67	8	1.31	.64	9	1.38	.67	7	1.47	.76	7
Family	1.31	.54	9	1.34	.56	7	1.32	.50	8	1.22	.50	13
Friends in major	1.26	.51	10	1.27	.52	12	1.28	.49	10	1.28	.55	12
Better grades	1.25	.51	11	1.28	.56	11	1.40	.65	6	1.36	.63	9
H. S. counselor	1.18	.46	12	1.16	.44	13	1.17	.45	11	1.71	.50	6
H. S. courses	1.17	.50	13	1.28	.60	11	1.28	.57	10	1.34	.63	11

Rating Scale: 1=No Importance, 2=Some Importance, 3=Very Important

CONCLUSIONS

Based on the findings of this study, the following major conclusions were drawn.

1. Over the 15 year period from 1977 to 1992, enrollment trends in undergraduates majoring in agriculture at MSU developed regarding age, classification and previous attendance at 2-year colleges. Students are older, have a higher classification and are more likely to have transferred from 2-year colleges.
2. The percentage of students from urban areas majoring in agriculture is decreasing while the percentage of rural, non-farm students is growing. This is a reversal of the trend thought to be developing over previous five year study intervals.
3. An increasing percentage of students in agriculture majors are graduating from public school while a decreasing percentage are graduating from private, non-religious schools. This trend began between 1982 and 1987.
4. Parents of students in agriculture majors continue to have a strong influence on their children regarding choice of major.
5. Students continue to select majors that will prepare them for careers and lead to desired lifestyles.

RECOMMENDATIONS

Recommendations were made based on the major conclusions.

1. The College of Agriculture and Home Economics at MSU needs to increase efforts to attract students just completing high school as well as continue to recruit students from community colleges.
2. Recruitment activities to increase enrollment of students from urban areas should be implemented being careful not to decrease the emphasis on recruiting rural students.
3. Private as well as public schools should be the focus of recruitment efforts by the College of Agriculture and Home Economics.
4. Efforts to recruit high school students to major in agriculture should not be limited to only those enrolled in high school agriculture programs. Although these students should not be overlooked. Parents of prospective students should be included in the recruitment process. Recruitment programs and campus visits should be structured to include the parents of prospective students.
5. Prospective students should be provided with accurate, up-to-date information concerning majors and the career opportunities available for graduates.

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LONGITUDINAL STUDY OF UNDERGRADUATE AGRICULTURE MAJORS: 1977, 1982, 1987, AND 1992

A Critique

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This study was a continuation of similar studies conducted at five-year intervals beginning in 1977. The introduction addresses previous research identifying variables related to choice of major and decision to enroll in colleges of agriculture. However, there was not a theoretical framework, as suggested, but rather a listing of findings from several studies. Helping us make sense of the literature related to the question would be useful, leading us naturally into methodology. This would help the reader see a logical rationale for the study's design, implementation, and reasons for the three objectives. At present, it appears very ad hoc and situational. The purpose and objectives, however, are clearly stated and followed through the study. It should be noted that comparisons across years were visual, not statistical.

Data collection and instrumentation was appropriate for a descriptive study. However, instrument reliability data would be useful. In Table 7, two trends that seemed to be overlooked were the decline of the influence of Father on choice of major while the influence of selected "significant others" seemed to increase. Mother's influence tended to remain stable. Is there any suggestion as to why? A future study might include a "significant other" concept as part of a model explaining how people make decisions.

The contribution of this study is primarily institutional. It would help to have a discussion explaining how this descriptive information is useful in extending the knowledge base in agricultural education. The conclusions and recommendations are not unique to this study. The recommendations might well have been made without the information presented in this study. Consequently, what have we gained as a result? Were there any ideas for future research resulting from findings in this study?

This study's contribution can be broadened by focusing on the relevant knowledge base rather than the situation. I suggest future studies be more conceptually grounded than programmatic. This will enhance the study's development including identifying important questions, concepts, relationships, definitions, and methodologies.

NOISE LEVELS OF SELECTED SECONDARY AGRICULTURAL MECHANICS LABORATORIES

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INTRODUCTION AND THEORETICAL FRAMEWORK

Noise surrounds us on a daily basis. Some noises are rarely heard and other noises can be annoying at times. The dangers associated with noise can be serious. The National Institute of Occupational Safety and Health (NIOSH, 1991) points out that noise exposure in mechanized industry poses a greater threat to one's health than noise exposures occurring in the general environment. Instructors and students involved in agricultural mechanics laboratories would certainly be classified into this category. Due to various learning experiences that take place in the laboratory, equipment is present that can very easily disrupt the normal hearing pattern of teachers and students.

Studies done by Bear (1969), Wall and Jessee (1971), Shell (1972), Madou-Bangurah (1978), Weston and Stewart (1980), and Bates (1983) concluded that agricultural mechanics laboratories exceeded safety limits set forth by Occupational Safety and Health Administration (OSHA) and the American Conference of Governmental Industrial Hygienists (ACGIH) (see Table 1). Even though many agricultural mechanics laboratories are equipped with various types of hearing protection devices (HPD's), teachers often choose not to use them. This fact is surprising considering the study by Westrom and Lee (1989) which concluded that agricultural science teachers felt laboratory noise was a major concern. Reynolds (1990) suggested that using HPD's in an environment of loud noise bursts would also reduce the temporary or possible permanent physical damage incurred from such exposure. Miller (1987) reported that HPD's are the most practical way to control exposure to noise. A study conducted by Lawver (1992) involving 237 teachers of agricultural mechanics programs in Texas, concluded that 83.1% did not make available plug style HPD's and 92.4% did not make available muff style HPD's.

Table 1 - OSHA and ACGIH Permissible Sound Exposure

Hours of Exposure Per Day	OSHA (dBA)	ACGIH (dBA)
8	90	85
6	92	*
4	95	90
3	97	*
2	100	95
1.5	102	*
1	105	100
.5	110	105
.25 or less	115	110

*Not rated by ACGIH

Bear (1969), Reynolds (1989), and Wall and Jesse (1971) noted in their studies that loud noise is one of the most hazardous conditions present in an agricultural mechanics laboratory. The duration of exposure to these noises can occur from a few minutes to an entire class period. Teachers in agricultural mechanics laboratories are prone to hearing loss due to their constant exposure to equipment noise. In fact, Plakke (1985) concluded in his report that industrial arts teachers are exposed to noise many more hours per week than their students. (Plakke, 1985; Burke, 1987) reported similar results in studies that showed agricultural mechanics laboratory teachers and Iowa industrial arts teachers attributed hearing loss to the environmental noise in their laboratories.

Students and teachers in agricultural mechanics laboratories may be aware of noise around them, but they may not be aware of potential health hazards associated with that noise. Daniels (1985), and Miller (1987) conducted studies that showed loud excessive noise does impair a students cognitive and psychomotor skills.

Noise is definitely a problem that needs to be taken seriously. Miller (1987) concluded in a his report that vocational education teachers should measure the noise generated in their labs by using monitoring instruments. Florentine (1990) emphasized in her study that education is needed for children of all ages and for adults exposed to work and recreational noises. She suggested that educational efforts could range from hour-long talks to comprehensive educational programs.

Although studies have been conducted in other states, no evidence was found of studies conducted in agricultural mechanics laboratories in Texas. The need existed to study noise levels in agricultural mechanics laboratories in Texas and determine if noise levels exceed OSHA and/or ACGIH standards. The result of this study could assist teachers in providing safer and healthier working conditions for themselves and their students. It will also assist them in the awareness for the need of proper hearing protection.

PURPOSE AND OBJECTIVES

The purpose of this study was to determine what noise levels teachers and students are exposed to in agricultural mechanics laboratories within a 40-mile radius of Lubbock, Texas. Specific objectives for this study were to:

1. Determine noise levels generated by a circular saw at close (at the source), intermediate (midway between source and nearest wall), and long range (at the nearest wall).
2. Determine noise levels generated by a right angle grinder at close (at the source), intermediate (midway between source and nearest wall), and long range (at the nearest wall).
3. Determine the association of laboratory size (cubic feet) with noise levels.
4. Determine the association of interior wall surface treatments, insulation, and door position (opened or closed) with noise levels.

METHODS AND PROCEDURES

Research Design. The design for the study was a descriptive survey designed to collect data to determine if noise levels in area agricultural mechanics laboratories met OSHA and ACGIH standards. Another purpose of this study was to determine if the size of the building, or interior wall treatments affected noise levels.

Subject Selection. The population of this study consisted of agricultural mechanics laboratories in a 40-mile radius of Lubbock, Texas. Data were collected in March and April of 1992. Data from two to three agricultural mechanics laboratories were collected on Wednesdays and Fridays until all laboratories in the study were completed.

Noise Level Measurement Procedures. When measuring noise levels in the agricultural mechanics laboratories, a circular saw and a right angle grinder were used. Since noise levels were first measured using the skill saw, two saw horses were set up in the middle of the laboratory as determined by the intersection of diagonals from corner to corner. Using a six foot 2x6 piece of soft wood, three noise measurements were taken. The first measurement (A) was taken right at the source. The second measurement (B) was taken midway between the source and the nearest wall. The final measurement (C) was taken directly at the wall. Upon completing noise measurements of the circular saw, noise measurements were taken using a right angle grinder in the same locations. A 4x8 1/4 in. plate of metal was utilized for grinding.

Sampling Equipment. When measuring noise levels in the agricultural mechanics laboratories, the investigator used a Simpson 884 Type S2A sound level meter which is approved by both OSHA and NIOSH. Before measuring noise levels at each location, the Simpson 890 Sound Level Calibrator was used to calibrate the Sound Level Meter to provide for accuracy when reading the sound meter.

Data Analysis. The data collected from this study were analyzed by a SPSS Macintosh computer program. The data were analyzed to determine if noise levels created by the circular saw and right angle grinder were within OSHA and ACGIH standards. The data were also analyzed to see if the size of the laboratory and if the interior wall surface treatments were associated with the noise levels within the laboratory. When analyzing the collected data, correlation coefficients and multiple regression were used to determine the association between dependent and independent variables.

FINDINGS

The mean noise levels of a right angle grinder and a circular saw are presented in Table 2. As indicated, the maximum permissible exposure per day with either power tool is one-half hour, one hour, or two hours based upon the distance from the noise source. The operator of either of these tools should limit their duration of exposure to no more than one-half hour per day.

Table 2 - Mean Noise Levels

Variable	n	Mean (dBA)	Max Duration*	SD	Range (dBA)
Grinder Location A	29	104.00	.5	0.00**	104
Grinder Location B	29	96.35	1	1.88	92 to 99
Grinder Location C	29	94.10	2	2.16	90 to 98
Saw Location A	29	105.00	.5	0.00**	105
Saw Location B	29	95.03	1	1.96	90 to 98
Saw Location C	29	92.07	2	2.02	87 to 96

* Permissible hours of exposure based on ACGIH Standards
** Noise levels for the saw and grinder at the source were 104 dBA and 105 dBA, respectively, in each of the laboratories.

The agricultural mechanics laboratories were measured to determine volume (CUFT). The mean volume was 59,050 cubic feet. Laboratories ranged in size from 20,000 to 126,000 cubic feet.

During the study, observations were made at each agricultural mechanics laboratory to determine if labs were insulated or non-insulated, if the door was opened or closed, and if the interior structure was metal or masonry. Due to various activities associated with the laboratories and the investigator's desire to not interrupt normal, everyday activities, it was impossible to control the position of the door. However, during actual noise level measurements, there were no other noises being generated in the laboratories The data in Table 3 shows the frequency and percentage of these dependent variables. Of the 29 agricultural mechanics laboratories visited, 6 (20.7%) were insulated and 23 (79.3%) were not insulated. The door was opened in 14 (48.3%) of the laboratories compared to 15 (51.7%) of the laboratories in which the door was closed. Also, 8 (26.6%) of the laboratories had a metal interior structure and 21 (72.4%) were masonry.

Descriptive data were used to determine if there was a correlation between noise levels of the circular saw and the right angle grinder to cubic footage, insulation, door and interior structure of the laboratory. Table 4 presents data to show the association. As shown in Table 3 there was a moderate association between cubic footage and noise levels of the saw midway between the source and the nearest wall and at the nearest wall. The grinder noise levels midway between the source and nearest wall and at the nearest wall had a negligible association with insulation and interior surfaces. All other variables had a low association.

Table 3 - Frequencies and Percentage of Selected Independent Variables

Variable	Frequency	Percent
Not Insulated	6	20.7
Insulated	23	79.3
Total	29	100.0
Door Open	14	48.3
Door Closed	15	51.7
Total	29	100.0
Metal	8	26.6
Masonry	21	72.4
Total	29	100.0

The only multiple regression equations which had independent variables enter at a statistically significant level were: (1) circular saw noise midway between noise source and the nearest wall; (2) circular saw noise at the nearest wall; and (3) right angle grinder noise midway between the noise source and the nearest wall.

As shown in Table 5, the best predictor in determining the magnitude of noise levels from a circular saw measured midway between noise source and nearest wall was lab volume and interior surface. Twenty-two percent ($R^2 = .224$) of the variance was accounted for by interior surface. This shows that the type of interior structure inside an agricultural mechanics laboratory does influence noise levels. The lab volume accounted for eleven percent ($R^2 = .115$) of the variance. In combination, the interior surface and lab volume accounted for 34% ($R^2 = .339$) of the variance. This shows that as lab volume increased, noise levels measured midway between noise source and nearest wall tended to decrease and that metal laboratories were noisier than masonry laboratories.

Table 4 - Correlation Coefficients

	CUFT[e]	INSUL[f]	DOOR[g]	INTSUR[h]
Grinder B[a]	-.239	.003	-.343	-.178
Grinder C[b]	-.241	-.015	-.343	-.224
Saw B[c]	-.448*	-.079	-.198	-.229
Saw C[d]	-.403*	.018	-.245	-.290

* $p \leq .05$

[a] grinder noise levels midway between source and nearest wall

[b] grinder noise levels at nearest wall

[c] saw noise levels midway between source and nearest wall

[d] saw noise levels at nearest wall

[e] cubic footage of shop area

[f] shop area insulated or non-insulated

[g] shop door opened or closed

[h] interior surface metal or masonry

Table 5 - Stepwise Multiple Regression of Circular Saw Noise Measured Midway Between Noise Source and Nearest Wall

Independent Variables	R	R^2	R^2 Change	df	F
Interior Surface	.473	.224	.224	(1,27)	7.80*
Lab Volume (CUFT)	.582	.339	.115	(2,26)	6.73*

* $p \leq .05$

Table 6 shows that the best predictor in determining the association of noise level from a circular saw measured at the nearest wall was lab volume. The total variance accounted for by the lab volume was sixteen percent ($R^2 = .162$). This again shows that as lab volume increased, noise levels measured at the nearest wall decreased.

Table 6 - Stepwise Multiple Regression of Circular Saw Noise Measured at the Nearest Wall

Independent Variables	R	R^2	R^2 Change	df	F
Lab Volume (CUFT)	.403	.162	.162	(1,27)	5.23*

* $p \leq .05$

Table 7 shows that the best predictor in determining the association of noise level from a right angle grinder measured midway between noise source and nearest wall was interior surface. The total variance accounted for by interior surface was nineteen percent ($R^2 = .188$). This shows that interior surface of an agricultural mechanics laboratory does influence the right angle grinder's noise levels midway between noise source and nearest wall. Masonry laboratories were generally quieter than metal laboratories

The independent variables lab volume, interior surface door position, and insulation were not found to be predictors for the right angle grinder at the source, and at the nearest wall.

Table 7 - Stepwise Multiple Regression of Right Angle Grinder Noise Measured Midway Between Noise Source and Nearest Wall

Independent Variables	R	R^2	R^2 Change	df	F
Interior Surface	.433	.188	.188	(1,27)	6.23*

* $p \leq .05$

CONCLUSIONS AND RECOMMENDATIONS

Conclusions. The following conclusions were revealed based on results of this study:

1. Teachers and Students in agricultural mechanics laboratories are exposed to noise levels that exceed OSHA and ACGIH permissible noise exposure standards depending on duration of exposure.

2. The interior structure of the laboratory is related with noise levels. Metal buildings tended to have higher noise levels than masonry buildings.

3. The lab size does correlate moderately with noise levels. As lab size increased, noise levels tended to decrease.

4. The location inside the laboratory such as at the source (A), midway between the source and nearest wall (B), and at the nearest wall (C) reflects a variance of noise levels from high levels to moderate levels.

5. Based on noise levels generated from the circular saw and the right angle grinder, HPD's should be worn by teachers and students when operating this equipment.

6. The findings of this study concur with findings of other studies (Bear, 1969; Wall & Jessee, 1971; Shell, 1972; Madou-Bangurah, 1978; Weston & Stewart, 1980; Bates, 1983).

Recommendations. Based on results and conclusions the following recommendations are suggested:

1. Similar studies should be conducted to determine noise levels of other equipment found in agricultural mechanics laboratories. (e.g., radial arm saw, table saw, planer, welders, etc.)

2. Studies should be conducted to determine noise levels in agricultural mechanics laboratories in others areas of Texas during normal laboratory operations.

3. The use of Hearing Protection Devices are highly recommended for teachers and students.

4. More effort should be expended on educating teachers and students about the dangers of noise and ways to limit exposure. Teacher educators and state staffs should monitor secondary laboratories for hearing protection as they visit agricultural science programs.

5. When determining the size, and type of interior structure, agricultural science teachers who are constructing a new agricultural mechanics laboratory should take noise levels into account. Generally, larger laboratories are less noisy and masonry buildings are less likely to have high noise levels.

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NOISE LEVELS OF SELECTED SECONDARY AGRICULTURAL MECHANICS LABORATORIES

A Critique

Glen C. Shinn, Clemson University--Discussant

The researchers have identified a problem, conducted an appropriate literature review, and developed a sound theoretical framework. The paper is very well organized with crisp writing and reporting. However, the last paragraph of the introduction is a weak rationale for conducting a study of noise; the evidence of noise and its effects are well documented.

The methods, procedures, design, sampling and data analysis were very appropriate for a descriptive study of noise in the learning environment. The findings were clearly presented. The tables were very well organized. The mechanics of the research was exemplary.

Conclusion 6 is a very good summary; "the findings of this study concur with findings of other studies (Bear, 1969; Wall & Jessee, 1971; Shell, 1972; Madou-Bangurah, 1978; Weston & Stewart, 1980; Bates, 1983)."

Recommendations 1 and 2 are weak and have very low priority for continued research. Recommendation 3 is very sound but could be made from a review of the existing literature. Recommendation 4 is mixed; a) more effort should be invested in changing the attitudes about noise, and b) today's organizational structure provides little authority to "teacher educators and state staffs" for monitoring secondary laboratories for hearing protection. Recommendation 5 should be directed to architects and facilities planners. Teachers have very little input into the design of new school plants.

The researchers should be commended on a good job of reviewing the literature and conducting the research. To quote the authors, "the dangers associated with noise can be serious." My concern is with the purpose and objectives. If noise is a hazard--and we know that it is; and if teachers and students do not use HPD's--and we know that they do not; then what educational strategies would best achieve the effective use of hearing protection and noise abatement devices? To paraphrase a current advertising commercial, life is short--ask the right questions! I would encourage the researchers to re-examine this issue and develop strategies to improve teacher and student attitudes about hearing protection and noise abatement.

OCCUPATIONAL STATUS AND EDUCATIONAL NEEDS OF COLLEGE OF AGRICULTURAL SCIENCES GRADUATES

by

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INTRODUCTION

There are a variety of reasons for evaluating educational programs in colleges of agriculture. These evaluations are conducted in a numerous ways including through faculty and administrative input, assessment of industry needs, and follow-up of graduates. Cheek & McGhee (1990) contend that follow-up studies are one of the most commonly used measures in evaluating programs.

Because agriculture is dynamic, curricula needs to be reviewed often to meet the demands of the evolving technical information and the constantly changing occupational requirements in the discipline. In higher education, there appears to be a negative perception among students concerning employment opportunities in agriculture (Hoover & Scanlon, 1991). Therefore, it is necessary for recruitment and retention purposes for advisors to know the occupational status of their graduates.

Graduates can provide valuable information concerning extra-curricular activities as well. In a study conducted by Major (1988), graduates reported that involvement in departmental and college clubs and organizations was important to them in developing career opportunities. Cheek and McGhee (1990) assessed graduates participation and perceptions about student organizations and concluded that they help graduates work with people in their careers.

A follow up study can also provide a unique perspective in evaluating the quality of instruction in college programs. Graduates are able to assess their learning experiences as a whole rather than on a course by course level as is the case with most teacher evaluations.

The outcomes of graduate follow-up studies can be revealing. They can provide information about student needs, expectations and the perceptions of their educational experience (Paret, 1991). Positive feedback from university graduates about their career status and success can be utilized as a public relations vehicle for college recruiting, as well as by employers seeking qualified candidates (Jackson, 1984). Major suggested that follow-up studies yield data that can be used to ensure efficient advisement of students, and the importance of involvement in extracurricular activities on campus.

PURPOSE AND OBJECTIVES

The purposes of this study were to determine the occupational status of recent graduates of the College of Agricultural Sciences at Texas Tech University and to evaluate their opinions concerning curricular and extra-curricular programs in the College. Answers to the following questions were sought as a means of accomplishing the purposes of this study:

1. What are the personal characteristics and the occupational status of recent graduates from the College of Agricultural Sciences at Texas Tech University?
2. What are the graduates' perceptions of their educational experience in the College of Agricultural Sciences at Texas Tech University?
3. What are the graduates' perceptions of the academic advisement in the College of Agricultural Sciences at Texas Tech University?

4. What are the graduates' perceptions of the value of student organizations in the College of Agricultural Sciences at Texas Tech University?

5. What are the graduates' perceptions regarding the curriculum offered in the College of Agricultural Sciences at Texas Tech University?

METHODS AND PROCEDURES

Population and Sample

The population was all students of the College of Agricultural Sciences at Texas Tech University who graduated from May, 1987 through December, 1991. The sample was a stratified random sample from each of the six departments in the College. This method was used in order to receive a response to accurately represent the population. In all, 660 of the 997 graduates who were in the population were included in the sample. Sample procedures followed the suggestions of Krejcie and Morgan (1970).

Instrumentation

The instrument used to collect data was developed by the researchers. It consisted of six sections: (1) demographic characteristics; (2) occupational information; (3) perceptions of educational experiences; (4) perceptions of advisement; (5) opinions of curriculum; and, (6) perceptions of extracurricular activities.

The questionnaire format was designed using a variety of questioning and response techniques. In determining the graduates' current occupation, respondents were asked to list their current occupation. Responses were then categorized into one of the employment clusters established by the United States Department of Agriculture (USDA) (Coulter, Goecker, & Slanton, 1990).

Graduates' perceptions of their educational experience was determined using a semantic differential scale using seven, bi-polar items. The bi-polar items were: valuable - not valuable; good - bad; pleasant unpleasant; strong - weak; successful - unsuccessful, satisfactory - unsatisfactory.

Perceptions about academic advisement were examined using a five-point, Likert-type scale with the following response choices: excellent, good, average, fair, and poor. The same scale was used for response choices for inquires about the graduates' perceptions about the curriculum. Graduates were also asked for information about the quality of teaching in the College of Agricultural Sciences and teaching outside the College. Here, a five-point, Likert-type scale was used with the following choices: strongly agree; agree; undecided; disagree; strongly disagree.

In determining the importance of extra-curricular activities, the graduates were first asked in which activities they took part. Respondents were to circle one or more of the following responses: departmental organizations; agriculture council; judging teams; honorary societies; student government; fraternity/sorority; other -- please list; and, none.

Collection of Data

The questionnaire was mailed to individuals selected to be in the sample. A letter of introduction and postage-paid return envelope accompanied the instrument. Three follow-up letters were sent to non-respondents with a copy of the instrument included with the second follow-up letter. Completed questionnaires were coded and keyed into microcomputer files.

Of the 660 questionnaires sent, 375 responses were collected for a response rate of 57%. Using the procedure outlined by Miller and Smith (1983), early and late respondents were compared to determine if there might be any differences between respondents and non-respondents. Since there were no significant differences between early and late respondents, these findings were generalized to the population.

Data Analysis

Data were analyzed using SPSS for the Macintosh. Frequencies and percentages were used to develop a profile of the respondents. The Mann-Whitney and Wilcoxon Rank Sum tests were used to check for significant differences between selected groups included in the study. These non-parametric statistics were used due to the ordinal nature of the dependent variables. A probability of < .05 was used to determine significance on all tests.

RESULTS

Personal Characteristics and Occupational Status of Graduates

The respondents' characteristics were very comparable to the known characteristics of the population (major and gender). The occupations of the respondents were categorized into groups established by the USDA. The largest number of graduates were employed in the Scientist, Engineer or Related Specialist cluster (22.7%). Nearly 21% were employed in the Agricultural Production Specialist cluster, more than 19% were in the Manager, Financial Specialist group, and 17.6% were in the Marketing, Merchandising, or Sales cluster. There were nearly 15% employed in the Education, Communications Information Specialists, and fewer than 5% employed in the area of Social Services Professionals. Figure 1 illustrates the distribution of Texas Tech graduates in each USDA occupational category.

Respondents reported their annual gross income. The greatest number of graduates (45.0%) indicated that they made \$20,000 - \$29,999. Less than 27% of the respondents made less than \$20,000 and more than 28% made \$30,000 or more.

Graduates' Perceptions of the Educational Experience

When asked if they would again enroll in the College of Agricultural Sciences at Texas Tech University, 83% of the respondents indicated they would. Ninety percent of the graduates from the Department of Agronomy, Horticulture and Entomology, the Department of Range and Wildlife Management, and the Department of Agricultural Education and Communications said they would enroll again. More than 82% of the respondents who graduated from the Department of Animal Science, and more than 80% of those from the Department of Agricultural Economics said they would enroll again. Only 62% of the gradates from the Department of Park Administration and Landscape Architecture said they would enroll in that department again.

Respondents were asked to rate the professors within the College of Agricultural Sciences as well as those from outside the College on the following factors: Clarity, Enthusiasm, Variety, Student Interaction, and Organization. On each of the five factors,

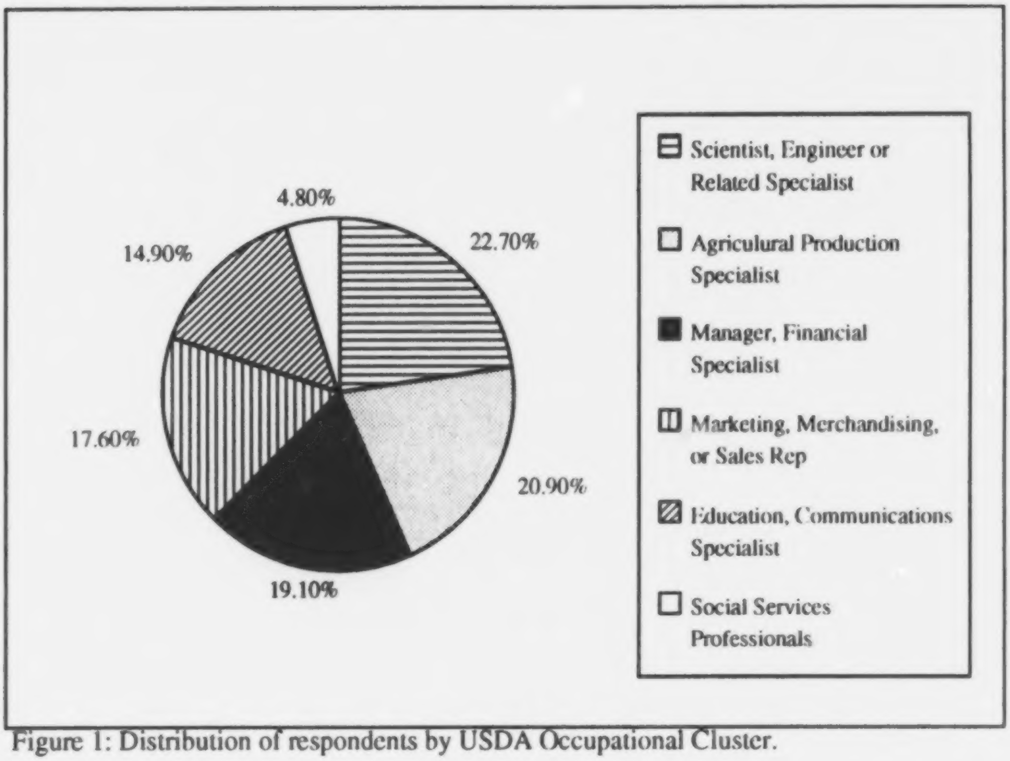

Figure 1: Distribution of respondents by USDA Occupational Cluster.

respondents rated professors from the College of Agricultural Sciences higher than professors from other colleges. A summary of the Wilcoxon analyses is reported in Table 1.

Graduates' Perceptions of their Academic Advisement

Nearly 40% of the respondents indicated that their academic advisement was excellent. About one-third of the graduates felt their advisement was good with nearly 15% indicating their advisement was average. Less than 14% of the graduates stated that their academic advisement was with fair or poor.

When broken down by department, graduates from the Department of Agricultural Education and Communications rated their advisement highest compared to graduates from other departments with a mean ranking of 4.09%. Animal Science graduates rated their advisement at 4.00%, followed by Agronomy, Horticulture and Entomology with 3.90%, Agricultural Economics with 3.81%, Park Administration and Landscape Architecture with 3.74%, and Range and Wildlife Management with 3.54% (see Figure 2).

Table 1. Wilcoxon analysis of teaching characteristics of professors within and outside the College of Agricultural Sciences.

Teacher Characteristic/ Faculty	Cases	Mean Rank	Z score	p
Clarity				
College of Agricultural Sciences	146	89.6	-9.69	.0000
Other Colleges	21	45.3		
Tie	180			
Enthusiasm				
College of Agricultural Sciences	160	101.8	9.32	.0000
Other Colleges	31	65.8		
Tie	157			
College of Agricultural Sciences	208	124.5	11.34	.0000
Interaction with Students				
Other Colleges	28	74.3		
Tie	113			
Variety of Methods Used				
College of Agricultural Sciences	240	158.5	-8.27	.0000
Other Colleges	74	154.3		
Tie	34			
Organization				
College of Agricultural Sciences	113	78.5	5.63	.0000
Other Colleges	39	70.6		
Tie	193			

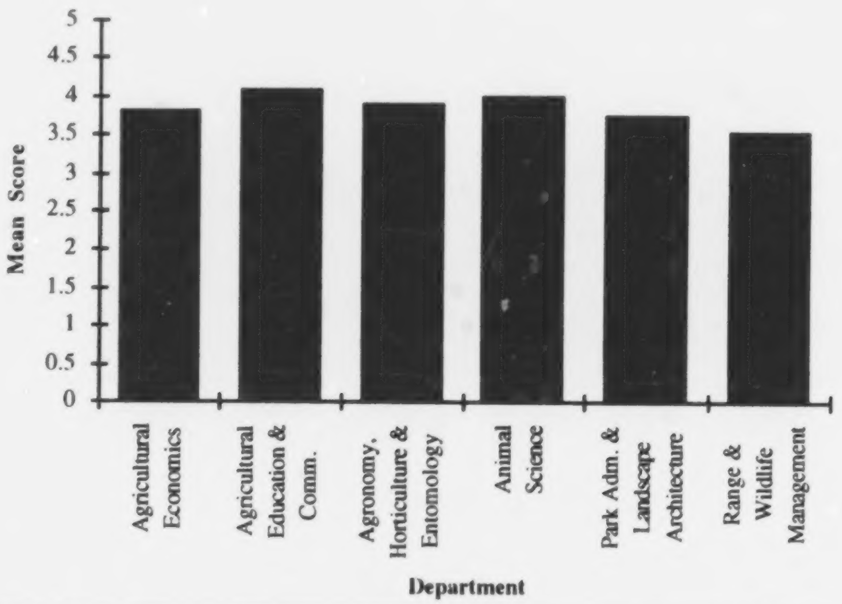

Figure 2. Rating of quality of advisement for each department.

Graduates' Perceptions about Extra-curricular Activities

More than 90% of the respondents were involved in one or more extra-curricular activities while they were working on their degrees. Over 72% of the graduates took part in departmental clubs, nearly 20% were involved in the College of Agricultural Sciences Student Council, more than 14% were members of judging teams and nearly 30% were in at least one honorary organization. Less than 29% were involved in social fraternities or sororities and 4.5% took part in student government (see Table 2).

Table 2. Graduates participation in extra-curricular activities.

Club/Organization	Frequency	Percent
Departmental Clubs	258	72.1
Honorary Fraternity	105	29.5
Social Fraternity/Sorority	102	28.7
College of Agricultural Sciences Student Council	69	19.4
Judging Teams	51	14.3
Student Government	16	4.5
None of the Above	34	9.6

In excess of 95% of the respondents indicated that students should get involved in extra-curricular activities. When the benefits of involvement in extra-curricular activities were assessed, develop team work (4.03) and build responsibility (3.83) were rated highest. In the areas of build occupational skills (3.47), help get a job (3.34), develop leadership (3.16), and help understand agriculture (3.16) extra-curricular activities were rated to be of some benefit.

Graduates' Perceptions about Courses

When the graduates were asked their opinion of general education courses, just over 12.0% said they were excellent. More than 60% indicated that general education courses were good, nearly 20% said they were average, about 7% said they were fair. Less than 1% perceived general education courses to be poor.

Nearly 86% of the respondents believed that technical agriculture courses were either good or excellent. More than 9% indicated that agriculture courses were average, 3.0% stated they were fair, and less than 1% rated them as poor.

In the College of Agricultural Sciences, there was a significant difference between the ratings of courses with the graduates' major department and those outside their department. Graduates from each department rated courses higher than did non-majors.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

1. Most of the respondents are employed in one of the following categories: Scientists, Engineers or Related Specialists; Agricultural Production Specialists; Managers and Financial Specialists.

2. The largest percentage of graduates from the College of Agricultural Sciences are earning between $20,000 and $29,999 per year.

3. The vast majority of the graduate from the College of Agricultural Sciences would enroll in the College again. More than 80% of the graduates from each department except the Department of Park Administration and Landscape Architecture stated they would enroll again.

4. The graduates rated teaching of the faculty from the College of Agricultural Sciences higher in clarity, variety, enthusiasm interaction with students, and organization than that of faculty from other colleges.

5. The vast majority of the graduates considered the quality of their academic advisement to be excellent or good.

6. Almost all of the graduates indicated that students should become involved in extra-curricular activities and most perceived that such involvement helps students to develop team work, build responsibility, develop occupational skills, get a job, develop leadership, and understand agriculture.

7. The vast majority of graduates perceive general education courses and technical agriculture courses to be excellent or good.

8. Graduates from each major in the College of Agricultural Sciences had a higher opinion of courses with their major than did non-majors.

Recommendations

1. Since graduates are entering a variety of fields, majors and courses that educate students for careers in each of the USDA occupations categories should continue to be offered.

2. Administrators and faculty should continue current practices that provide students with positive educational experiences including quality teaching and effective advisement.

3. A comparatively high percentage of graduates from the Department of Park Administration and Landscape Architecture stated they would not enroll in that program if they had it to do over again. Faculty from that department should examine their programs to determine why this situation exists.

4. Students should be advised to become involved in extra-curricular activities because of the many benefits that they provide.

5. If professors outside of the College of Agricultural Sciences wish to improve their teaching evaluations by students from the College of Agricultural Sciences, they should review methods and procedures being used by teachers within the College of Agricultural Sciences.

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OCCUPATIONAL STATUS AND EDUCATIONAL NEEDS OF COLLEGE OF AGRICULTURAL SCIENCES GRADUATES

A Critique

Thomas L. Grady, Southwest Texas State University - Discussant

This study raised some interesting questions that are probably useful to the program in question. However, the literature review fails to adequately develop the foundation for the study including conceptual indicators, operational definitions, and appropriate methodology. These appear later in an ad hoc fashion. Moreover, the literature review tends to justify methodology rather than offer a logical analysis of the literature leading naturally into the purpose and objectives of the study. The purpose of the study needs to be clarified. For example, what is meant by "...evaluate their opinions..." in the purpose statement? Reporting perceptions is a different issue than evaluating those perceptions. The nature of the research questions assumes a descriptive study when an evaluation study is at least implied in the literature review and the purpose statement. Is description alone sufficient for evaluation?

The population was clearly described and data collection procedures appropriate. However, I am curious as to how many late respondents were compared to early respondents. The instrument seems to be congruent with the questions but reliability information needs to be included. Also, it would be helpful to have the instrument more fully described and justified in the instrumentation section rather than later in the results section. For example, the teaching quality indicators were not discussed until responses to these were reported. Why were these factors selected to indicate quality teaching? If they came from the literature, this should be cited. Also, some of the measures are too general to be very useful. To say that a certain percentage of respondents indicated that advisement in a given department was good may not help much. In addition, why were colleges compared on teaching characteristics? What purpose does this serve in the context of the study?

The conclusions and recommendations from this study are limited to the institution at which this study was conducted. They are appropriately stated and limited to such in the report. However, some of the recommendations could have been made without this study. In other words, how many recommendations are unique to findings in this study? I would also like to see what future research directions might be suggested from this study.

In future studies, a more fundamental approach to the research question combined with a more direct and firm linkage to the literature will yield a study with a broader contribution to knowledge.

PERCEPTIONS OF AGRICULTURAL BIOTECHNOLOGY AND POTENTIAL EFFECTS ON AGRICULTURAL EDUCATION

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INTRODUCTION

Biotechnology has been broadly defined as being the use of living organisms to improve processes, or develop products that are useful to mankind (Savage, 1987). This process generally involves variation in a living organism through the manipulation of genetic materials through the use of recombinant DNA and RNA technology (Olexa and Degner, 1990).

Biotechnology currently is somewhat controversial and often poorly understood. Increasing public concern about food and health safety, animal welfare, and the maintenance of environmental quality has directed public attention towards the potential role of biotechnology in agriculture. To date, little information has been collected concerning the opinions and perceptions of agricultural producers, county extension faculty, and the general public about genetic engineering and related biotechnologies. Because of the potential impact of agricultural biotechnology on society, it is essential that a knowledge base consisting of the perceptions and attitudes of these three populations concerning biotechnology be developed and expanded. The development of such a knowledge base can play a vital role in realizing the potential benefits of agricultural biotechnology.

Those responsible for research and development of Extension educational and informational programming need access to accurate and current information which identifies characteristics or properties of agricultural biotechnologies that clientele consider to be either beneficial or harmful. Extension programming will need to focus upon an increased educational and informational need that will accompany an increased application of and exposure to agricultural biotechnology. For Cooperative Extension to meet these needs, they must understand their clientele's fears, perceptions, and opinions concerning products and processes developed through agricultural biotechnology. They must have an accurate, current, and comprehensive source of information from which to draw data to develop programs which meet these informational and educational needs.

Hoban (1989) found that most agricultural producers were willing to examine the potentials of agricultural biotechnology in their operations. Producers believe that certain applications of agricultural biotechnology are suitable for improving agricultural production and, in some cases, more desirable than more traditional methods. While only a portion of the producers currently have an understanding of the fundamentals of agricultural biotechnology, they demonstrate continued interest in obtaining more information.

Olexa and Degner (1990) found that county extension faculty in Florida believed that agricultural biotechnology is a significant development in technology, and warrants the further development of progressive extension programs to meet the needs of their clients. In addition, county extension faculty believed that there was indeed a real need to learn more about agricultural biotechnology in order to continue as effective educators.

The general public has varying degrees of both understanding and information concerning agricultural biotechnology. Those individuals that are unfamiliar with or are not well educated in the various aspects of agricultural biotechnology have a tendency to fear some biotechnological developments. A study done by Hoban (1989) found that much of the general public is willing to accept many types of agricultural biotechnology as viable alternatives to past modes of agricultural production. Much of the general public believes that certain applications of agricultural biotechnology are even desirable and warrant further development.

Public perception and acceptance of agricultural biotechnologies ultimately will decide the success or failure of the agricultural biotechnology industry and product development.

PURPOSE AND OBJECTIVES

The primary purpose of this study was to compare and to determine the degree of knowledge, the opinions, and to determine the educational and informational needs of agricultural producers, county extension faculty, and members of the general public in Florida regarding genetic engineering and other related agricultural biotechnologies.

The specific objectives of this study were to:

(1) Identify areas of agricultural biotechnology with which members of the three populations demonstrate interest, knowledge, and concern.
(2) Identify which types of agricultural biotechnologies are accepted or rejected by agricultural producers, county extension faculty, and the general public using, as an example, genetic engineering.
(3) Determine if there exists a relationship between the socio-demographic characteristics of the three populations, and their opinions, knowledge, acceptance, or rejection of agricultural biotechnologies.
(4) Identify the degree to which agricultural producers, county extension faculty, and the general public desire more information on genetic engineering.
(5) Identify from which sources agricultural producers, county extension faculty, and the general public are obtaining information concerning biotechnology.

PROCEDURE

Three populations within Florida were examined. These populations consisted of the public, county extension faculty, and agricultural producers.

Agricultural producers were selected from a stratified sample of producers in ten Florida counties. The sample was drawn from a frame of farmer extension clientele for each of the counties, and was generated by the county extension faculty of each county. Due to the diversity of agriculture in Florida, it was considered important to obtain data from a variety of agricultural enterprises and geographical ranges within the state. Two counties, each with the largest number of agricultural producers, were selected from each of Florida's five extension districts. These ten counties were considered ideal for this study for three main reasons. First, Florida is represented geographically. Secondly, these counties were representative of both urban and rural producers including those that lived both in close proximity to metropolitan areas and those that were fairly well isolated. Finally, each of the ten counties had the largest agricultural producer population within their respective district.

The data concerning the county extension faculty was obtained from a randomly selected sample of all Florida county extension faculty. At the initiation of this study, the total population of active faculty in the Florida Cooperative Extension Service was 292. Extension faculty that participated in this study served a single county appointment. Simple random sampling of county extension faculty at a confidence level of 95% yielded a sample size of 175.

The third population examined by this study was the public or consumers of Florida. Data for the public were collected through the use of a randomly selected sample of adults living in Florida. Data are from the Florida Consumer Attitude Survey conducted by the University of Florida's Bureau of Economic and Business Research, March of 1991. The function of this survey program is to determine consumer confidence and other attitudes about economic conditions in Florida. For purposes of this study, questions concerning genetic engineering and biotechnology were included in this survey. The sample of Florida consumers consisted of 632 adults, 18 years of age and older. These respondents were contacted by telephone, and were selected through the random digit dialing method.

Three instruments were used to collect data from the three populations examined. Questions included on the two mailed surveys and the phone interview were adapted from an earlier study conducted by Dr. Thomas Hoban of North Carolina State University (Hoban, 1989).

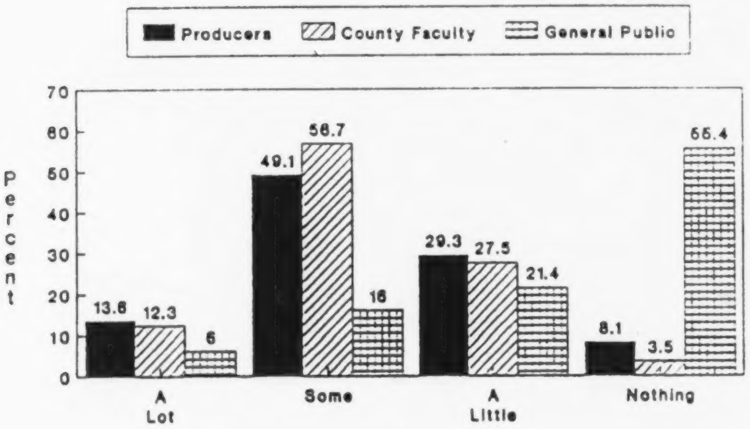
All three of the instruments were pilot tested before being sent to the participants to 1) evaluate the practicality of the data collection instrument, 2) ensure that the target audience was receptive to the questions, 3) determine if the question format and content was appropriate, and 4) identify any potential problems or biases that may exist in the data collection process.

Of the initial sample of 175 county extension faculty that were surveyed, 172 completed questionnaires were received by the researcher, yielding a response rate of 98%. After several follow-ups, 225 of the 384 producers responded.

FINDINGS

Objective One. To accomplish objective one, a series of questions related to genetic engineering was utilized. Among the findings was that the majority of producers and county faculty said they had at least heard a little about genetic engineering. The majority of the general public said they had heard nothing (see Figure 1).

FIGURE 1. Responses to the question "How much have you heard about Genetic Engineering?"



Frequency:
Producers n=381 Public= 617
County Extension Faculty n=174

Agricultural producers, county extension faculty, and the public were questioned about the amount of information that they had heard about different applications of genetic engineering. Participants were asked how much they had heard about pest-resistant plants, herbicide-resistant plants, bovine somatotropin, and ice-minus bacteria. The majority of agricultural producers and county extension faculty indicated that they had heard at least a little about pest resistant plants and herbicide resistant plants. Those members of the public that indicated that they had heard about genetic engineering said that they had heard at least a little about pest-resistant and herbicide-resistant plants.

The majority of agricultural producers indicated that they had heard nothing about bovine somatotropin and ice-minus bacteria. The majority of county extension faculty said that they had heard at least a little about bovine somatotropin and nothing about ice-minus bacteria. Just under half of the public that indicated they had heard about genetic engineering said they had heard nothing about bovine somatotropin, while the majority indicated that they had heard nothing about ice-minus bacteria.

Very few producers (9.4%), faculty (1.8%), or members of the general public (5.3%), believed that genetically engineering plants is morally wrong. A high proportion (45.5%) of the general public indicated they didn't know if it was morally wrong.

On the same question related to animals, 20.3% of the general public and 16.1% of the producers believed genetic engineering was morally wrong.

Respondents were asked the degree to which they were concerned about eating genetically engineered fruits and vegetables as well as meats and dairy products. Approximately 37% of the general public was at least somewhat concerned with eating genetically engineering fruits and vegetables. In contrast, 47.2% of the general public was concerned about eating genetically engineered meats and dairy products.

Objective Two. Agricultural producers, county extension faculty, and members of the public were questioned whether or not they would support farmers' use of genetically altered organisms in agricultural production. The majority of agricultural producers and county extension faculty as well as just under one-third of the public supported farmers' use of genetically engineered plants. The majority of agricultural producers also supported farmers' use of genetically engineered viruses and bacteria, with relatively few opposing bacteria and virus use. Just under half of the county extension faculty supported farmers' use of genetically engineered viruses and bacteria while nearly one-fourth either did not know or had neutral opinions. Only about one-fourth of the public supported farmers' use of genetically engineered viruses and bacteria.

Each group was questioned whether or not they would support or oppose field testing an application of genetic engineering in their community. The majority of agricultural producers and county extension faculty, and just under one-third of the public supported the field testing of genetically engineering bacteria in their communities.

Objective Three. The demographic variables (education level, gender, age, race, type of farm, and income) were compared to a series of questions to determine if there was a relationship between demographics and attitudes about biotechnology. Spearman rank correlations were used for comparisons. A significant low (.20) negative relationship was found between education level and amount heard about genetic engineering by the public. No practically significant relationships were found between demographic variables and the following questions:

1) Would you support the use of genetically engineered plants to fight diseases?
2) Would you support the use of genetically engineered viruses to fight diseases?
3) Would you support the use of genetically engineered bacteria to fight diseases?
4) Would you support the local field testing of genetically engineered bacteria?

Objective Four. Agricultural producers, county extension faculty, and members of the public were questioned about how interested they would be in finding out more information about genetic engineering. The majority of agricultural producers and county extension faculty were at least "somewhat interested" in finding out more about genetic engineering. Just under one-half of the public were at least "somewhat interested" in finding out more about genetic engineering. Of the public responding, most indicated that they were not interested in finding out more about genetic engineering. Relatively few of the agricultural producers and county extension faculty said that they were not interested.

Objective Five. The fifth objective of this study was to identify from which information sources agricultural producers are obtaining information concerning agricultural biotechnology. Agricultural producers were asked to indicate the amount of information they obtained from several sources of agricultural information including the Cooperative Extension Service, the Florida Department of Agriculture, the United States Department of Agriculture, farm supply dealers, the Farm Bureau and commodity organizations. Most agricultural producers said that none of their agricultural information was obtained from the Florida Department of Agriculture, the United States Department of Agriculture, farm supply dealers, the Farm Bureau or commodity organizations. Over half said they obtained at least some of their agricultural information from the Cooperative Extension Service.

Nearly two-thirds of the agricultural producers said that the Cooperative Extension Service was the one source which they would like to provide more information about biotechnology.

CONCLUSIONS

The following conclusions may be drawn from this study:

1. Most agricultural producers, county extension faculty and members of the general public were not concerned about consuming genetically engineered fruits, vegetables, meats, or dairy products.
2. Most agricultural producers and county extension faculty have heard at least a moderate amount about biotechnology.
3. Most agricultural producers, county extension faculty, and members of the general public have heard at least a moderate amount about genetic engineering.
4. Agricultural producers, county extension faculty and the general public who had heard about genetic engineering were interested in finding out more about genetic engineering.
5. Agricultural producers and county extension faculty were inclined to think that the genetic engineering of plants and animals was moral; the general public remained "neutral".
6. Agricultural producers and county extension faculty were interested in finding out more about genetic engineering, while the general public had no interest in finding out more about genetic engineering.
7. Agricultural producers were most likely to obtain their agricultural information from the Cooperative Extension Service.
8. Most of the agricultural producers and county extension faculty supported farmers' use of genetically engineered plants, viruses, and bacteria to fight plant diseases.
9. Most of the agricultural producers and county extension faculty supported the local field testing of genetically engineered bacteria to fight frost damage to citrus, while most of the general public remained "neutral".

RECOMMENDATIONS

1. The Cooperative Extension Service should continue to provide educational information to producers about biotechnology and genetic engineering.
2. The Cooperative Extension Service should address the informational and educational needs of its non-farm or "general public" clientele more effectively by developing programs which: a) develop and expand the role of the general public in the establishment and education about the regulation of biotechnology and genetic engineering, and b) provide clarification and education about the application of biotechnology and genetic engineering to agricultural production.
3. Further research is needed to determine if the perception of Florida's county extension faculty, agricultural producers and the general public are consistent with members of these populations on a nationwide basis.

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PERCEPTIONS OF AGRICULTURAL BIOTECHNOLOGY AND POTENTIAL EFFECTS ON AGRICULTURAL EDUCATION

A Critique

George Wardlow, University of Arkansas -- Discussant

The purpose of this study was to explore the knowledge of and educational needs of Florida Extension personnel, agriculture producers and the general public regarding agricultural biotechnologies. The underlying premise is foundational to future research in and a future mission to the Agricultural and Extension Education profession. The authors should be commended for their attempts.

The Purpose and Objectives were clearly stated and provide a well-laid out plan for research. The Procedures were simple and correctly executed. The Findings were interpreted and presented in a clear and concise format. The authors did an admirable job in interpreting the results in such a manner as to make them easy for a practioner to understand. Several issues arise from a review of the paper which, if addressed, should make it stronger.

The Introduction section makes several assertions and assumptions, each of which is critical to the development of the theoretical framework for the study. These assertions and assumptions build an important rationale for why "the problem" is a problem and why it warrants research. Unfortunately, few of them are supported by the relevant literature. The reader is left to wonder if they are based on fact or supposition.

While the procedures appear to be generally sound, several important details seem to have been omitted. The paper reports that of the population of 292 Extension personnel, a sample of 175 was drawn to satisfy a 95% confidence level. However, while the paper states that a "sample was drawn from a frame of farmer extension clientele" as a means of identifying agricultural producers, no mention was made of the size of this sample, of the size of the population or of the frame. There was no explanation of the methods used in determining sample size. For the third population under study, the general public in Florida, the researchers did explain their use of an existing data base as the frame for their study. No size of this population or frame was reported and no explanation was offered for how the size of this sample size was determined.

The reader is presented little information about the nature of the three instruments reportedly used. The paper indicates that they were pilot tested and provides a comment to indicate that they were found to possess some validity. However, the process used is not explained, and no indication was provided that instrument reliability was addressed.

The paper reports that 98% of the Extension sample participated, but made no mention of the participation rates of the other two samples. The phrase "of the public responding" used in the Findings for Objective Four leads one to believe that something less than a 100% response rate was achieved. Now, what are the consequences for these omissions? For at least two of the three samples, the reader has no data from which to determine the likelihood that they are representative of the populations from which they were drawn. Therefore, the results, conclusions and recommendations cannot be generalized to these populations (as the authors have done). As presented, the findings are of little value.

Nearly three pages of what the authors call "Findings" are presented in this quantitative study with very little statistical data. Throughout, the reader is left to wonder what proportion of respondents constitutes a "majority" or "just under half," or what is the difference between "nearly one-fourth" and "only about one-fourth." These terms represent an Interpretation of the Findings to which the reader is not privy.

To summarize, the researchers are to be commended for addressing an important issue to Agricultural and Extension Education. However, the disregard for following accepted convention in reporting research prevents this paper from making a needed contribution to the body of research in the profession.

PERCEPTIONS OF GEORGIA HIGH SCHOOL AGRICULTURAL EDUCATION INSTRUCTORS REGARDING THE HUNTER EDUCATION PROGRAM

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PERCEPTIONS OF GEORGIA HIGH SCHOOL AGRICULTURAL EDUCATION INSTRUCTORS REGARDING THE HUNTER EDUCATION PROGRAM

The Hunter Education program is a comprehensive instructional program usually sponsored by state departments of natural resources Hunter Education is usually disseminated to the public in a unit of instruction delivered in split-sessions with a total length of 6 to 9 hours. The major emphasis of this program is to prevent accidents and thereby secure the future of the sport by making it safe. In order to accomplish this, students must be taught a diverse array of topics, including gun safety and information on how to be good stewards of natural resources.

The Hunter Education Program is based on natural resources. The program materials are researched and written by various state Natural Resources Departments These materials should be of use to most agricultural educators as they incorporate natural resources instruction into their curricula. (Weber and Williams, 1990).

Natural resources instruction has been a part of Agricultural Education for years and is currently expanding. Andrews, Weber, Whent, and Williams (1991) stated that environmental conservation education should be included in educational systems. Additionally, their research indicated that the conservation of natural resources is important and that more education is needed in this area.

The benefits of natural resource and environmental education are numerous for students and schools. Specifically, Schwartz (1987) reported that students developed a more positive academic attitude after experiencing environmental education instructional activities.

A national survey of fifth and sixth grade students (Llewellynn and Westervelt, 1985) revealed that these students, who previously had not had the benefit of natural resources instruction through Agricultural Education, demonstrated limited knowledge about wildlife. The researchers recommended that wildlife oriented materials be infused into established school curricula. *The Hunter Education Guide for the State of Georgia* states that hunting accidents are usually the result of a lack of knowledge of the principles of safe handling of firearms and hunting behavior, or the failure of hunters to practice these principles. Hunter education programs are designed to teach these principles to inexperienced hunters (Brown, 1991).

Nationwide, over the past 20 years, accidents with firearms involvement have decreased by half. Robert Delfay, executive director of the National Shooting Sports Foundation (1992), states the following reason, "The dramatic decline in firearms related accidents over the last two decades is in good part attributable to nationwide hunter safety training, the almost universal use of hunter orange safety clothing and industry-sponsored educational programs."

In a nationwide study, Elliott, (1991) found that there has been a dramatic decline in hunting accidents as Hunter Education has become widespread. His study goes further to suggest that, at least for the safety issue, Hunter Education and its instructional methods have been very effective. In 1991, 47 of the 50 states had legislation requiring hunters to pass a Hunter Education course. The three states not participating in mandatory hunter safety courses, Alaska, Massachusetts and South Carolina, have voluntary Hunter Education (Hunter Education Program Profile, 1992) There are other mandatory programs for all types of hunters. Bow hunting education courses are mandatory programs in 8 states and are voluntary programs in 15 states. Trappers are required to take a course in 10 states (Hunter Education Program Profile, 1991).

In 1987 the Georgia General Assembly passed legislation mandating hunter safety training for all hunters born on or after January 1, 1961. This law dictates that each hunter complete an approved course of instruction and be certified before he or she can legally purchase a hunting license. The law further dictates that while children under 12 years of age are not required to have completed the course, hunters aged 12 to 16 must have a hunter safety certification card on their person while hunting, and they must have hunter safety certification to receive their honorary big game tags (Hunting Seasons and Regulations, 1991-92).

Leadership training in Hunter Education is readily available to agricultural educators through State Departments of Natural Resources. In 1991 volunteers taught Hunter Education in all 50 states . In 1991 educators taught the Hunter Education program in 33 of the 50 states. (Hunter Education Profile Program, 1992). Elliott, (1991) reported that there are an estimated 50,000 volunteer Hunter Education instructors. Furthermore, he stated that Hunter Education in its present form would not be possible without this extensive network of volunteers. Approximately 3/4ths of the Hunter Education Coordinators participating in Elliot's study reported 95% or more of their instructors were volunteers.

According to a study reported by Jackson, (1990), the Hunter Education program in the State of Georgia is quite effective. Among the responses gathered were those concerning natural resources. The majority of the respondents indicated that they hunt for appreciation of nature. Over seventy eight percent of students in the Hunter Education program said that they were eager to enroll in Hunter Education, and were motivated to study and learn about wildlife, safety, and hunting skills. The participants rated these items on a scale of 1 to 5, pertaining to effectiveness of Hunter Education. The results were: Nature appreciation - 4.17; Outdoor activity - 3.85, Knowledge of the principles of wildlife - 3.58; and Wildlife identification - 3. 21.

In the area of related natural resources instruction, the study indicated that the program augmented the student's own inclinations toward wildlife and nature appreciation. The student's positive motivation toward Hunter Education may benefit natural resources instruction, thus allowing teachers to incorporate parts of this instruction, as applicable.

Spencer (1991) profiled a set of Northwest Arkansas deer hunters. His findings indicated that the vast majority of deer hunters were closely aligned with the principles of Hunter Education programs. Of the areas examined, Hunter Education was the most positively accepted area. The data indicated the following: 95.6% of Northwest Arkansas hunters indicated that Hunter Education should be continued for safety's sake; 90.4% felt that Hunter Education helped promote ethical behavior; and 86.6% indicated satisfaction with the existing Arkansas Hunter Education program.

PURPOSES AND OBJECTIVES

Since the Hunter Education program is such an important educational and safety component of natural resource management and it can be adapted into and benefit a local Agricultural Education program, a study was needed to determine the perceptions of Agricultural Education teachers in Georgia regarding the program. Specific objectives for the study are as follows:

1. Identify the extent to which Agricultural Education instructors in Georgia use the Hunter Education program.
2. Ascertain the extent of the benefits of Hunter Education to Agricultural Education as perceived by teachers.
3. Determine the rationale for using Hunter Education as a part of the Agricultural Education program.
4. Determine the demographics of the agricultural Education instructors who use Hunter Education.

METHODS AND PROCEDURES

The population consisted of all 261 teachers of Agricultural Education in Georgia's Middle, Junior and Senior High Schools. Using a formula from *The University of Georgia Handbook of Survey Research*, the researchers determined that a sample size of 155 subjects would be needed. A stratified random sample was drawn using the Georgia Department of Education Districts as the strata with proportional sampling per district.

Using information gathered from a literature search, a questionnaire was developed by the researchers and submitted to a panel of experts to determine validity. The instrument was pilot tested and revised accordingly. An initial mailing and two follow-ups resulted in a 73% return rate. The data were analyzed using descriptive statistics.

THE FINDINGS

The first objective of this study was to identify the extent of Hunter Education in Agricultural Education in Georgia. The respondents indicated that 47.9% of agricultural educators utilize Hunter Education in some fashion as part of their Hunter Education program. Table one displays the data.

Table 1
Extent of Agricultural Education Instructors usage of Hunter Education

Program Variable	Percentage of Instructors
Aware of mandate law	93.2
Aware of program	94.9
Teach natural resources	77.8
Teach outdoor recreation	59.5
Teach outdoor skills and safety	61.5
Teach orienteering	78.6
Other teachers use Hunter Ed.	20.4
Others in Comm. teach Hunter Ed.	82.6
Used Ranger as resource	55.8
Students involved in competition	46.9
Trap and skeet	38.2
NRA program	3.64
Orienteering	20.0
Forestry & N. R.	72.7

The average number of total students trained per agricultural/Hunter Education program is 255. The average number of students that are trained annually per Agricultural/Hunter Education program is 48.5. The average number of students per Agricultural/Hunter Education program with Hunter Education related Supervised Agricultural Experience projects is 8.04. The average number of students per Agricultural/Hunter Education program who pursue Hunter Education related post-secondary degrees is 4.74. Agricultural educators that teach Hunter Education reach students of the following grade levels: 1.92% - Elementary; 13.5% - Middle School; 21.2% - Junior High; 86.5% - High School; 9.62% - Post-secondary/Adult.

The second objective of this investigation was to ascertain the extent of the benefits of Hunter Education to Agricultural Education as perceived by teachers. To answer this question, the subjects were given statements asking for their responses based on a Likert scale of 1 to 5, with 1 representing strongly disagree and 5 representing strongly agree. The teachers generally agreed (means ranged from 3.39 to 4.29) that teaching Hunter Education was a benefit to Agricultural Education programs. Table 2 displays the data.

Table 2
Perceived Benefits of the Hunter Education Program

Benefit	Mean Score
Increased enrollment	3.39
Increased student motivation	3.67
Helped public relations	3.5
Increased administrative support	3.39
Made natural res. inst. more effective	3.84
Overall program benefit	4.29

The third objective of this research was to determine the rationale for using Hunter Education by Agricultural Education instructors. The agricultural educators that utilize Hunter Education ranked the reasons why they use Hunter Education in the following order:: 1 - Concern for student safety; 2 - Natural resources instruction; 3 - Student motivation; 4 - Recruitment; 5 - Public relations; 6 - Concern for anti-hunting issues; 7 - Concern for anti-firearms issues; 8 - Administrative support. Analysis indicated that 55.8% of the teachers plan to expand natural resources instruction. Almost 47% indicated that their students are involved in competitions related to Hunter Education.

The fourth objective of this research was to determine the demographics of the agricultural/hunter educators. The agricultural educators whose programs utilize Hunter Education indicated that the average agricultural/hunter educator is 36.1 years of age and has 12.3 years of experience as an educator. Over 95% of the agricultural/hunter educators were male and 4.5% were female. The data indicated that 74.4% of agricultural educators hunt. The types of hunting that they engage in are the following: 76.9% - big game, 76.6% - small game, 61% - upland bird, 35.9% - waterfowl, and 19.5% - predator. The data indicated that 91.5% of agricultural educators own firearms. The average agricultural educator owned 6.32 firearms. The uses that the educators indicated for these firearms were as follows: 84% - hunting, 67.7% - personal protection, 37.4% - target shooting, 27.3% - trap & skeet shooting, 24.2% - collection. The data indicated that 20.7% are certified Volunteer Hunter Education Instructors.

CONCLUSIONS

Almost half of the Agricultural Education programs utilize Hunter Education in some fashion. Of agricultural educators, almost one- fourth are volunteer Hunter Education instructors. Agricultural educators are employing instruction in Hunter Education related topics including natural resources, outdoor education, orienteering, and outdoor safety and skills.

- Over one-half of the Agricultural Education programs have utilized the local department of natural resources conservation ranger in some fashion, either to assist in FFA meetings or natural resources instruction.

Very few programs compete in the NRA Hunter Education Youth Challenge, but a significant number compete in trap and skeet competitions. The majority of the programs compete in the FFA sponsored Forestry and Natural Resources Contests. These contests include wildlife identification, forestry management, and other Hunter Education related areas.

Almost all agricultural educators recommend that other agricultural educators utilize Hunter Education. The Agricultural Education teachers who use Hunter Safety agree that it benefits the entire Agricultural Education program.

The average respondent involved in Agricultural/Hunter Educational is 36 years of age, but has 12 years experience as an educator, and over one-half hold a Master's degree.

The Agricultural/hunter educators indicate that they on average train 255 students per year per program. Using this number, 255 students, one may extrapolate that agricultural educators in Georgia reach a significant number of Hunter Education students each year. There are 150 Agricultural Education programs in the state of Georgia, when multiplied by the number of programs which utilize Hunter Education programs, 47.9 per cent, the number yielded is 71.85. Seventy one point eight five multiplied by the number of students, 255, yields that over 18,000 students are trained in Hunter Education by agricultural educators each year. The majority of these students are trained in high schools.

RECOMMENDATIONS

Since the instructors who use the Hunter Education Program perceive that it is beneficial to the Agricultural Education Program, more programs should become involved in Hunter Education.

Teacher preparation programs should make their students aware of the Hunter Education Program.

Leadership training by the state Department of Natural Resource Management should provide inservice workshops for teachers interested in the program.

This study should be conducted on a national level.

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PERCEPTIONS OF GEORGIA HIGH SCHOOL AGRICULTURAL EDUCATION INSTRUCTORS REGARDING THE HUNTER EDUCATION PROGRAM

A Critique

Robert Terry, Jr., Texas Tech University -- Discussant

The significance of this study is important. As the scope of agricultural education programs in secondary schools is broadened, emerging areas of the curriculum should be studied. As the authors pointed out, the benefits of teaching young people about natural resources is of great value. However, we must make sure that courses in natural resources and wildlife management do not become "hunting and fishing" classes. Students must gain knowledge that will help them make wise choices about the environment and be able to enjoy work and recreation in it more safely.

The introduction provided a good background for the study. It explained the development and rationale for the teaching of natural resources and discusses the reduction in hunting accidents that has coincided with the teaching of hunter education courses. The idea of teaching hunter education to secondary-school-aged-students should have been specifically addressed to further justify this study.

The purpose is perhaps too narrowly focused -- only one objective (objective 2) deals with perceptions. The objectives were researchable and clearly stated. The sampling procedures and methods of developing the instrument were appropriate. Conclusions were based upon the results and the recommendations were based upon the conclusions. The results were difficult to read in some instances (i.e. is there a difference in "agricultural education programs and agricultural/hunter education programs?) The use of more tables and/or figures could have enhanced the presentation of the data.

In reviewing this paper, several questions arose. While validity was discussed, the authors did not report the reliability. Was the reliability of the instrument assessed and if so, what was it?

For the results related to objective one, the authors reported that nearly 48% of the respondents "utilize hunter education in some fashion as a part of their hunter education program." This variable did not appear in Table 1. Was that factor an individual variable or a conglomeration of variables? Apparently only six benefits to hunter education were listed in the questionnaire. Could there be other benefits? Perhaps data related to this objective could have been collected through the use of an open-ended question. The demographic information was interesting and could have added an interesting dimension to the study. Did the authors consider analyzing the relationships between demographic characteristics the other variables in the study?

As stated earlier, the conclusions and recommendations were well founded. I am concerned about the wording of the first conclusion, however. It sounds as though natural resources education is a part of hunter education, when, in my opinion, the reverse is true.

Finally, there should be a conclusion related to teacher training to teach hunter education courses. The data indicate that 48% teach hunter safety, but only 21% are certified to do so. While several recommendations related to the matter are listed, a conclusion would help emphasize its importance.

PERCEPTIONS OF UNIVERSITY STUDENTS ABOUT CONTROVERSIAL ISSUES RELATED TO AGRICULTURE

by

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INTRODUCTION AND THEORETICAL FRAMEWORK

Much attention has been given to the fact that American society is "agriculturally ignorant." Coon and Cantrell (1985) pointed out, "Today, the public's image of agriculture is a kaleidoscope of leftover attitudes and images of what agriculture was in the '40's, '50's, and early '60's" (p. 22). While newly developed agricultural literacy programs have been designed to improve such images, there are other factors that might cause agriculture to have a less than appealing image.

Urbanization of the population of the United States has contributed to inaccurate perceptions and low awareness about agriculture. Sorenson (1987) stated that as our population continues to shift to cities, fewer Americans are likely to have contact with production agriculture. Because most people in this country do not have to be concerned about the supply of high quality food and fiber, many fail to understand its benefits to our society (USDA, 1983).

Some of the most controversial topics currently being considered in our society involve agriculture. Today, special interest groups have been organized concerning issues such as food safety, animal welfare, and the environment. These groups are often well funded, have celebrity spokespersons, and receive a great deal of attention from the media. The efforts of these groups and their members have brought about changes in agricultural practices and policies if not in the perceptions that the general public has about the industry (Watson, 1991; Howard, 1991; Paschall, Hollingsworth, Craig, et al, 1992).

Several agricultural groups have taken the offensive to counter-act the messages of animal rights and environmental activist groups (Warner, 1991; Culliton, 1991). Agricultural literacy programs also include objectives to inform a variety of audiences about the ways in which food and fiber producers treat animals ethically and work in harmony with the environment while providing safe and healthy products.

It is vital that the general public have accurate perceptions about agriculture for several reasons. Agriculture is important because of its impact upon society, the economy, the environment and personal health. University students represent the next generation of policy-makers. It is important to understand their perceptions regarding issues related to agriculture so that educational programs might be designed to meet their needs. Therefore, the problem of this study was: Considering the negative attention that has been directed towards agriculture and the social changes that have taken place in the United States, how do university students perceive controversial issues related to agriculture?

PURPOSES AND OBJECTIVES

The purpose of this study was to determine the perceptions of university students regarding controversial issues related to agriculture and how the students' demographic characteristics are associated with those perceptions.

The following objectives were formulated to accomplish the purpose.

1. Identify selected demographic characteristics of university students.
2. Determine perceptions of university students regarding controversial issues related to agriculture.

3. Identify demographic characteristics associated with university students' perceptions concerning controversial issues related to agriculture.

METHODS AND PROCEDURES

The population of this study was all students enrolled at Texas Tech University during the spring semester of 1992. The University has an enrollment of approximately 24,600 students in seven colleges and two professional schools (medicine and law).

A sample of 400 students was selected which exceeded the minimum sample for a population of this size suggested by Krejcie and Morgan (1970). Using procedures proposed by Dillman (1978), a random sample was drawn from the Texas Tech University 1991-92 Telephone Directory.

The instrument used to collect the data was a questionnaire designed by the researchers. Part I consisted of questions pertaining to demographic characteristics of the students. These characteristics included: College (Agricultural Sciences, Architecture, Arts and Sciences, Business Administration, Education, Engineering, Home Economics, Law, Medicine), Classification (Freshman, Sophomore, Junior, Senior, Graduate), Age (20 or younger, 21 - 22, 23 - 25, 26 and older), Hometown (Farm or Ranch, Country but not a Farm or Ranch, Town of less than 5,000 residents, City of 5,000 50,000 residents, City of 50,000 to 1 million residents, Metropolitan of more than 1 million residents), Ethnicity (African-American, Asian-American, Hispanic-American, Native American, White American, International Student), and Gender.

Part II was composed of questions addressing controversial issues related to agriculture with five point, Likert-type scaled responses. The choices were: 1 = strongly disagree, 2 = disagree, 3 = neutral or undecided, 4 = agree, 5 = strongly agree. Faculty of the College of Agricultural Sciences at Texas Tech University were solicited to provide topics and questions concerning issues in their field. At least one faculty from each department contributed to the study.

Validity and reliability of the instrument were assessed by a panel of experts composed of faculty from the College of Agricultural Sciences and a pilot test was conducted. Following the data collection, a Chonbach's alpha of .87 was calculated on the items in Part II.

Data were collected via telephone using procedures suggested by Dillman (1978). Ten agricultural communications students were hired to administer the questionnaire with each caller assigned to obtain 40 responses. Correlation coefficients were calculated between the variable "caller" and all other variables. The caller variable was found to have no more than a .19 correlation with any of the other variables and most correlations were found to be negligible.

Statistical analysis was completed using SPSS for the Macintosh. Means, standard deviations and correlation coefficients were computed for each item.

Factor analysis was performed on the responses to the items in Part II of the questionnaire. According to Kim and Mueller (1978), a scree test can be used to determine the number of factors to be extracted. In this case, five factors were extracted. Items were grouped into the five factors based upon their factor loading using an orthogonal rotation. Items with a loading of less than .50 were eliminated.

Upon examination of the factor loadings, each of the five factors were named. The factors were named as follows: Food Safety, Animal Welfare, Farming Practices, Animal Medications, and Impact of Agriculture. To obtain a factor score for further analysis, an average was computed for each factor. Table 1 contains the items in each factor and the loading for each.

Table 1. Means, standard deviations and factor loadings for each factor.

Factor/ Item	Mean	S.D.	Factor Loading
Food Safety	**4.14**	**0.52**	
Vegetables like celery, carrots & potatoes are safe to eat.	4.23	0.54	.84
Fruits like apples, peaches, & oranges are safe to eat.	4.22	0.56	.81
Milk and dairy products are safe to eat	4.16	0.59	.77
Fish, chicken and turkey are safe to eat.	4.11	0.68	.76
Red meats like beef, lamb and pork are safe to eat.	3.97	0.76	.66
Animal Welfare	**3.14**	**0.79**	
It is okay to use animals for research to discover or test medications to help humans.	3.79	1.04	.75
Animals used for the production of food are treated in a humane way.	3.38	0.98	.61
Research animals are treated in a humane way.	2.98	1.10	.72
It is okay to use animals to test make-up soaps, and cleansers.	2.83	1.21	.51
It is okay to produce animals primarily for their hide or fur to be used for products like fur coats.	2.73	1.15	.67
Farming/Ranching Practices	**2.85**	**0.65**	
Methods used to raise livestock and grow crops do not have detrimental effects on land, air and water.	3.24	0.94	.55
I would pay more for food that has not been treated with any chemicals or hormones.	2.83	0.56	.68
I try to buy foods labeled "organic" or "natural."	2.87	0.99	.59
Farmers and ranchers use an appropriate amount of chemicals to grow their products.	2.96	0.87	.63
Agricultural production practices need not be changed to care for the environment.	2.45	1.01	.63
Animal Medications	**3.31**	**0.73**	
It is okay to give animals medication to help them grow fast and stay healthy.	3.68	0.86	.58
It is okay to give hormones to animals produced for their meat to help them grow fast and stay healthy.	3.19	0.99	.69
The use of artificially introduced hormones should not be banned.	3.08	1.00	.63
Impact of Agriculture	**4.42**	**0.52**	
Agriculture is an important contributor to our economy	4.52	0.61	.68
Farmers and ranchers care about the environment.	4.32	0.67	.70

Correlation coefficients, oneway analysis of variance (ANOVA) and stepwise multiple regression were employed to analyze the relationships between and among variables. The Modified LSD post hoc test was used to identify differing variables detected by the ANOVA procedures. An alpha level of $p < .05$ was used on all tests.

RESULTS

A total of 390 usable responses were obtained for a response rate of 97.5%. The demographic characteristics of the respondents indicated that the sample was representative of the population. Each classification, ethic group and gender were appropriately represented. Likewise, there was appropriate distribution of the students by college as illustrated in Figure 1.

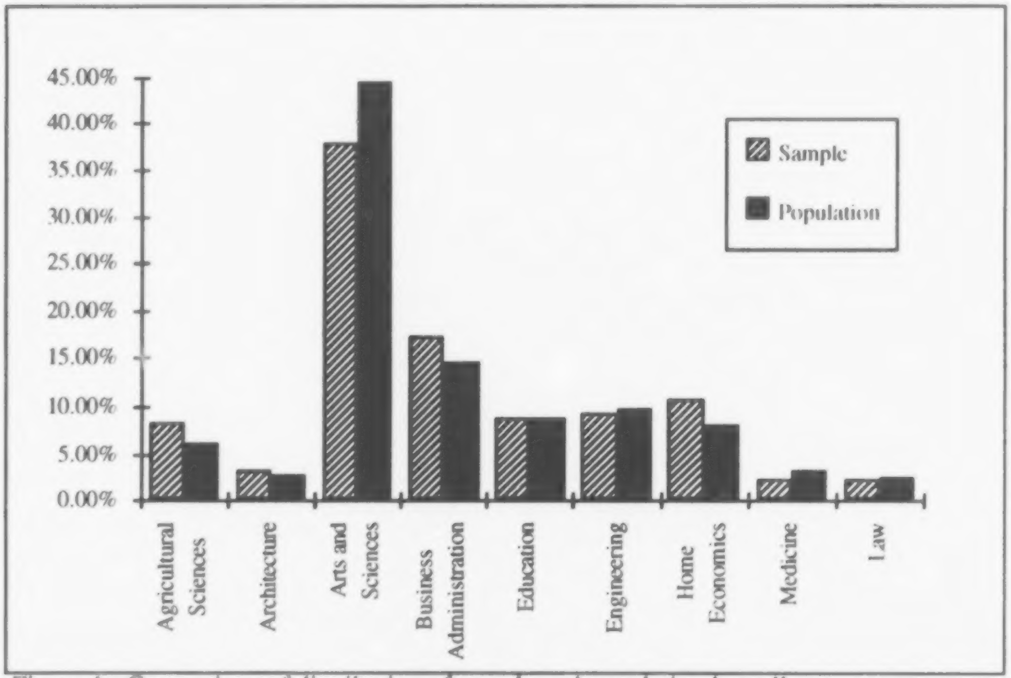

Figure 1: Comparison of distribution of sample and population by college.

Over all, university students agreed that their food is safe to eat. The Food Safety factor had a mean of 4.14 on the five point Likert-type scale. They also agreed with the items in the Impact of Agriculture factor (4.42) indicating they were positive about the role of agriculture on our economy and the environment.

The student body was neutral or undecided concerning the Animal Welfare, Farming/Ranching Practices, and Animal Medication factors. The means for Animal Welfare (3.14) and Animal Medication (3.31) were above the midpoint of the scale and the mean for Farming/Ranching Practices (2.85) was below the midpoint of the scale. Table 1 reports the means and standard deviations for each factor.

The analysis of each factor by college in which respondents were enrolled indicated that students enrolled in the College of Agricultural Sciences were significantly different than students from one or more of the other colleges on each factor (Table 2).

Agriculture students had more favorable perceptions of food safety, animal welfare, farming/ranching practices, and animal medications, than did students in the College of Arts and Sciences. Agriculture students differed from engineering students on the food safety factor, from architecture students on animal welfare, from home economics students on farming/ranching practices, from medical students on animal medicine, and from business administration students on the impact of agriculture. No significant differences were found on any factors between agriculture students and students in the College of Education or the School of Law.

Table 2. Factors where significant differences were found by college.

College	1	2	3	4	5	6	7	8	9
Agricultural Sciences (1)		b	a,b,c,d	e		a		c	d
Architecture (2)									
Arts and Sciences (3)									
Business Adm. (4)									
Education (5)									
Engineering (6)									
Home Economics (7)									
Medicine (8)									
Law (9)									

* $p < .05$

modified LSD post hoc test used

a = food safety, b = animal welfare, c = farming/ranching practices, d = animal medication, e = impact of agriculture.

The analysis of variance by classification showed significant differences between juniors and seniors on food safety. There was a significant difference between students less than 20 years of age and those ages 20 to 22 on the animal welfare factor with the younger students having more favorable perceptions. There were no other differences in perceptions about any of the factors between the other age classifications or ethnic groups.

When the factors were compared by hometown, students who were from a farm or ranch had significantly more favorable perceptions food safety and animal welfare than did students from communities of less than 5,000 to more than 1 million. They were also more favorable about farming and ranching practices than students from cities of 5, 000 or more, and more favorable about the impact of agriculture than students from cities of 50,000 or more (see Table 3).

Males and females differed on each of the five factors. Males had more favorable perceptions about each factor except farming practices. Table 4 shows the results of the post hoc test.

Stepwise multiple regression revealed that one or more of the students' demographic characteristics explained a significant portion of the variance associated with each of the five factors. Hometown explained by far the greatest amount of the variance for every factor except Animal Medication. For each of these four factors, gender explained the second greatest portion of the variance.

Table 3. Factors where significant differences were found by hometown.

College	1	2	3	4	5	6
Farm or Ranch (1)			a,b	a,b,c	a,b,c,e	a,b,c,e
Country, but not a Farm or Ranch (2)						
Town of less than 5, 000 (3)						
City of 5,000 to 50,000(4)						
City of 50,000 to 1 million (5)						
Metropolitan of more than 1 million (6)						

* $p < .05$
modified LSD post hoc test used
a = food safety, b = animal welfare, c = farming/ranching practices, d = animal medication, e = impact of agriculture.

Table 4. Analysis of variance of factors by gender.

Factor	Mean score by gender Females	 Males	F	p
Food safety	4.08	4.19	4.95	.0266*
Animal welfare	2.99	3.28	12.87	.0004*
Farming/ranching practices	2.76	2.93	6.093	.0140*
Animal medication	3.11	3.50	29.65	.0000*
Impact of agriculture	4.50	4.35	7.56	.0063*

* $p <.05$

Hometown and gender explained 6.84% of the variance associated with the Food Safety factor, 8.37% associated with the Animal Welfare factor, 6.60% of the variance associated with the Farming/Ranching Practices factor, and 4.60% of the variance associated with the Impact of Agriculture factor.

For the Animal Medication factor, gender (7.10%), college (1.63%), and hometown (1.24%) explained nearly 10% of the variance. A summary of the regression procedures is reported in Table 5.

Table 5. Stepwise regression analysis of students' characteristics on each factor.

Dependent Variable/ Independent Variable	R	R^2	R^2 Change	df	F
Food safety					
Hometown[a]	.2407	.0579	.0579	(1,388)	23.86*
Gender[b]	.2616	.0684	.0105	(2,387)	14.21*
Animal Welfare					
Hometown[a]	.2344	.0550	.0550	(1,388)	22.57*
Gender[b]	.2893	.0837	.0287	(2,387)	17.63*
Farming/Ranch Practices					
Hometown[a]	.2298	.0528	.0528	(1,388)	21.26*

Table 5. (Continued)

Dependent Variable/ Independent Variable	R	R^2	R^2 Change	df	F
Farming/Ranch Practices					
Gender[b]	.2569	.0660	.0132	(2,387)	13.67*
Animal Medication					
Gender[b]	.2665	.0710	.0710	(1,388)	29.65*
College[c]	.2954	.0873	.0163	(2,387)	18.50*
Hometown[a]	.3158	.0997	.0124	(3,386)	14.25*
Impact of Agriculture					
Hometown[a]	.1580	.0250	.0250	(1,388)	9.93*
Gender[b]	.2144	.0460	.0210	(2,387)	9.92*

* $p < .05$

a Hometown coded: 1 = farm or ranch, 2 = country, not a farm or ranch, 3 = town < 5, 000, 4 = small city 5,000 - 50, 000, 5 = city 50, 000 to 1 million, 6 = metropolitan more than 1 million.

b gender coded: 1 = female, 2 = male.

c College coded: 1 = Agri. Sciences, 2 = Arch., 3 = Arts & Sciences, 4 = Business Adm., 5 = Education, 6 = Engineering, 7 = Home Econ., 8 = Medicine, 9 = Law.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

1. Over all, university students perceive the food supply to be safe to eat and that agriculture has a positive impact on our economy and environment.

2. University students have neutral or undecided perceptions concerning animal welfare, farming and ranching practices, and the use of medications on animals.

3. Students from the School of Law and College of Education tended to have the same perceptions as did students from the College of Agricultural Sciences. Students from all other colleges tended to differ from students from the College of Agricultural Sciences on one or more factors.

4. Male university students have more positive perceptions about food safety, animal welfare, farming and ranching practices, and the use of medications on animals than do their female counterparts.

5. Of the demographic characteristics studied, hometown and gender explain the greatest amount of variation associated with students' perceptions about food safety, animal welfare, and farming and ranching practices.

6. Of the demographic characteristics studied, gender, college, and hometown explain the greatest amount of variation associated with students' perceptions about the use of medications on animals.

Recommendations

1. Students enrolled in colleges other than the College of Agricultural Sciences, the School of Law, and College of Education should be provided with accurate information concerning controversial issues related to agriculture, particularly in the areas of animal welfare, farming and ranching practices, the use of medications on animals, and the impact of agriculture on our economy and the environment.

2. Programs to inform university students about controversial issues related to agriculture should be designed to target students from cities and metropolitan areas and females.

3. A study should be conducted to determine why students from the College of Agricultural Sciences have similar perceptions to students from the School of Law and College of Education.

4. A study similar to this one should be conducted with university students from other regions of the nation and on campuses with out a college of agriculture.

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PERCEPTIONS OF UNIVERSITY STUDENTS ABOUT CONTROVERSIAL ISSUES RELATED TO AGRICULTURE

A Critique

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Knowing the perceptions of others about agriculture is essential if we are to have any impact on shaping our destiny. In a university setting, we can hardly attract students or resources and prosper if people do not understand our field or our mission. This study was done extremely well. The rationale for the importance of the topic was clearly communicated. The purpose and objectives were concisely stated. The methods and procedures were explained so that another researcher could easily replicate the study. The analysis of data were appropriate and the discussion of the results gave the reader descriptive, relational, and predictive information. The conclusions and recommendations were based on the findings. The following discussion poses a couple of questions for clarification, but mostly notes strengths of the study.

From the display of sample and population data, it appears that any frame error, effecting distribution, from using the university telephone directory was minimal. The 97.5% response rate reflects an excellent job by the callers. One might be curious as to what happened to the other 2.5%. Did they refuse to answer the survey? Were they not available? Were they lost cases? Some statement as to their status would be helpful particularly if they were lost cases indicating error in the directory.

The reported validity and reliability of the instrument is very good. The study was strengthened by the care taken to assure that results of the study could be attributed to the test and not the callers. With regard to categories in Part I, there is some discrepancy between age categories. Was the first category 20 and younger or under 20? This is important to clarify since some significant differences were found between age groups. What was the rationale for the groupings particularly for including such a large range of ages in the 26 and over group?

The data analyses were methodical and comprehensive. A reader appreciates the reporting of procedures, especially when factor analysis is used. The data were clearly displayed in tables. The only table in which superfluous information appeared was Table 4. Is it really necessary to report computer alpha values if they are less than what is selected for the test of significance? The researchers effectively discussed the variance associated with the selected factors.

In addition to the stated conclusions and recommendations, perhaps the researchers should consider focusing some of their future research and/or agricultural information on the College of Arts and Sciences. The research supports the profession's concern for perceptions held by urban/metropolitan populations and a need for agricultural education in those areas. Perhaps the researchers have some ideas on conducting and assessing future agricultural projects in more urban settings. Congratulations to the researchers for conducting an excellent study.

PILOT EVALUATION OF THE BIOTECHNOLOGY IN AGRICULTURE CURRICULUM IN OKLAHOMA:

A PROGRESS REPORT

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INTRODUCTION AND THEORETICAL FRAMEWORK

The National Research Council (1988) recommended improvements in agricultural education by applying concepts from physical, chemical, and biological sciences to teaching agriculture. The 1988 Council report recommended an updated curriculum, more scientific content, and relating the content to the increasingly scientific and technical nature of agriculture. Recent Carl Perkins legislation provides funds to integrate academic and vocational education.

Biotechnology is one area that readily integrates science and agriculture. The National Research Council (1987) defined biotechnology as

> methods of using plants, animals, and microbes, either wholly or in part, to produce useful substances or improve existing species. More specifically, biotechnology is the use of technologies based on living systems to develop commercial processes and products (p. 3).

Martin and Baumgardt (1991) further described biotechnology as follows:

> Biotechnology involves the integration of such advanced disciplines as biology (plant, animal, and microbial), biochemistry, molecular biology, genetics, chemical engineering, and computer science (p. 4).

In response to the aforementioned recommendations the Oklahoma Department of Vocational and Technical Education (ODVTE), during the summer of 1991, issued a request for proposals to establish Biotechnology in Agriculture programs in comprehensive high schools already offering agricultural education. Applicants attended a two-day Biotechnology in Agriculture workshop in July. Applications were received and analyzed and six schools were chosen as pilot sites: Alva, Altus, Copan, Hartshorne, Marietta, and Union City. The curriculum used was Biotechnology in Agriculture developed by The Mid-America Vocational Curriculum Consortium (MAVCC).

Biotechnology in Agriculture is a competency-based curriculum "designed to emphasize the interrelationship of science and technology and the impact of this technology on agriculture and agricultural products" (MAVCC). The course consists of the following six units: (1) Introduction to Biotechnology; (2) Genetics and Genetic Engineering; (3) Impacts of Biotechnology; (4) Biotechnology in Plant Science; (5) Biotechnology in Animal Science; and, (6) Microbial Biotechnology in Agriculture.

It was deemed important by the ODVTE's Division of Agricultural Education in conjunction with the Agricultural Education Department of Oklahoma State University to evaluate the pilot testing of the Biotechnology in Agriculture curriculum

PURPOSE

The primary purpose of this study was to evaluate the Biotechnology in Agriculture curriculum as piloted in six Agricultural Education programs in the state of Oklahoma.

OBJECTIVES

The objectives of this study were to:

1. Measure competencies gained by high school students enrolled in Biotechnology in Agriculture.
2. Assess changes in attitudes toward science of students enrolled in the course.
3. Assess the attitudes of participating Agricultural Education instructors, administrators, and students toward biotechnology and this approach to teaching biotechnology.
4. Evaluate the attitudes of participating Agricultural Education instructors toward the MAVCC Biotechnology in Agriculture curriculum.

METHODS AND PROCEDURES

Scope

The population examined in this study included those students enrolled in Biotechnology in Agriculture at six high schools in Oklahoma: Alva, Altus, Copan, Hartshorne, Marietta, and Union City; six Agricultural Education who taught the course, and, superintendents and principals of the six pilot sites. The total number of students who enrolled in the program was 81. The entire population was studied.

Instrumentation

A total of six instruments were utilized in this study: The Biotechnology in Agriculture test, an inventory of scientific attitudes, a student information sheet, a teacher survey, an administer survey, and a student group questionnaire.

The Biotechnology in Agriculture test was designed by the researcher as a pre-test/post-test. The test was composed of selected representative questions from all units of the MAVCC curriculum. The test was reviewed by Dr. Tom Rehberger, a biotechnology expert at Oklahoma State University to determine content validity.

The inventory of scientific attitudes, also used as a pre-test/post-test, was constructed by Richard Moore and Frank Sutman in 1970 and was tested extensively for validity and reliability (Moore & Sutman, 1970). The authors claimed that the instrument had all of the following characteristics:

1. Preparation based upon specification of the particular attitude to be assessed;

2. Use of several items to assess each attitude;
3. Provision for the respondent to indicate the extent of his acceptance or rejection of an attitude statement; and,
4. Concern with intellectual and emotional scientific attitudes (p.85).

The teacher survey, the administrator survey, and the student group questionnaire were investigator developed and reviewed by research experts in the Oklahoma State University Agricultural Education Department.

Data Collection

The pre-biotechnology test and the pre-attitude inventory were administered to the students by the investigator in November. Students also filled out information sheets at this time. The investigator explained the purpose of the study to the students and emphasized that their performance on the tests would have no bearing on their grades for the class. The pre-assessments were not given earlier in the year due to delays in program and evaluation approval.

The investigator assessed science background of students by compiling and analyzing students' National Percentile Ranks (NPR) of the science portion of the Iowa Test of Basic Skills.

The Biotechnology post-test and the attitude inventory post-test were administered to the students in May. The teacher and administrator surveys were administered at the same time. Following the post-test a focus group interview was conducted to gather students' perceptions of the course. The same investigator conducted the interview at each site, thus eliminating the need to train interviewers. The teacher survey, administrator survey, and the student group interview were qualitative in nature and asked for open-ended responses.

In addition to completing the survey given during the post-test, teachers were asked to attend a follow-up meeting. The meeting included a focus group interview conducted to reinforce the responses given on the aforementioned teacher survey.

Data Analysis

The data gathered was both quantitative and qualitative. All statistical treatment of quantitative data was performed using the System for Statistics (SYSTAT) computer program. Statistical procedures used were: means, variances, t-tests, and correlations. Qualitative data was organized into categories and reported in narrative format.

FINDINGS

There were positive differences in both attitude and Biotechnology tests. However, due to the limitations of the study, the researchers believe that the qualitative aspects of the study are more beneficial for this presentation. These aspects are reported below.

Students, teachers, and administrators were over all very favorable to the course. Results of the student interview, teacher questionnaire and interview, and administrator survey will be discussed here.

Students were asked the following six questions to help determine their perceptions of the Biotechnology in Agriculture course. Responses are from all students who were present the day the post-test was given.

1. *Is this class more applicable to Agriculture, Science, or both?* The overwhelming majority - 77.78 percent - chose "Both" as their answer.

2. *What specific things did you like about Biotechnology?* Students particularly liked the hands-on aspects of the course. Surprisingly, most students seemed to enjoy the genetics-related labs and activities. Some students particularly liked the interaction with the community and their families that came about because of the course (one activity in the curriculum requires students to conduct a community poll of perceptions of Biotechnology). They valued the practical approach to learning science and said the course helped them understand changes that may occur in the future.

3. *What specific things did you dislike about Biotechnology?* Even though students said that the course was related to science and agriculture, they reported that the work was particularly difficult and was heavily weighted with scientific principles. Many students complained of not having lab equipment when they were ready to perform experiments. (Due to delays in selecting sites, the teachers did not order equipment until after school had begun. Some equipment was not received until late in the spring.)

4. *How does this class compare with any other science classes you have had?* One student stated that Biotechnology was "more in depth, more diversified, more practical." Students reported that the course contained more hand-on activities and less textbook activities. They said that it was more interesting and more individualized. One stated that the course was "one of the best science classes I ever had." Another stated that it was "harder - more detailed; that's good."

5. *How does this class compare with any other Agricultural Education classes you have had?* Students agreed that the Biotechnology course was much more difficult and more science oriented than other Agricultural Education courses. One student said that the

course "deals more with the process of agriculture, rather than just production aspects." Another stated that it "shows that people other than farmers are involved in Ag."

6. *What changes do you think should be made in the course?* Students seemed to think the units should be broken down into shorter sections. They were concerned about the availability of laboratory equipment and materials. They said that the class size should be limited to twelve students and that other teachers should be involved. One student said that the course would be more meaningful if "home-grown experiments were used."

Teachers were asked 13 questions concerning the entire Biotechnology in Agriculture course. Also, teachers met informally to discuss the course further. The results of that part of the study follow.

1. *Do you perceive this course as being more applicable to science, more applicable to agriculture, or equally divided between the two? Why?* All but one teacher said the course was equally divided between the two. The one who disagreed said the course was more applicable to science because "if they don't have a good background before they take the course, they will have difficulty." The other teachers said the curriculum used science as well as agricultural examples and that students have to have a knowledge of both in order to succeed in the class.

2. *Do you believe that this course changed students' attitudes toward science? If so, how?* Teachers answered "yes" unanimously. One teacher responded as follows: "Most definitely. Students who came to class just as another science class were excited about the practical experiments and the applicability of the course."

3. *What were your students' perceptions of the course?* All teachers reported that students' perceptions were very positive. The students enjoyed the class and enjoyed piloting the program.

4. What are parents' perceptions of the course? Overall, parents were excited about and impressed with the course.

5. *How does your principal perceive this course?* Teachers seemed to believe that their principals were well pleased with the course. Principals were seen as supportive of the course and looked at it as a very good science course.

6. *How does your superintendent view this course?* Teachers also saw superintendents as being very positive toward the course. They seemed to enjoy the publicity that the school was getting from the course.

7. *Should students be given science credit for this course?* All teachers agreed that science credit should be given as long as student learner outcomes for science were covered.

8. *What should be the prerequisites for the course?* Teachers did not exactly agree on this question. All, however, did believe that *Biology I* should be a prerequisite. Some thought that *Biology II* and *Chemistry* should be taught, and some thought that *Agriculture I* should be a prerequisite.

9. *What is your overall perception of this course?* One teacher commented that it was "an excellent course for the student to learn - apply learning and arrive at an answer they understand." Another said that the course was "equal to or more challenging than regular science classes."

10. *Do you see the need for a graduate level course aimed at teaching Biotechnology in Agriculture? If so, briefly describe this course.* Most teachers agreed that extra course work would be helpful, but that teachers could learn enough with which to teach the course by attending biotechnology workshops.

11. *What advice would you offer to someone who is planning to teach this course next year?* Teachers said that teachers planning to implement the course should be prepared to teach early. Equipment should be ordered with time to spare, and class size should be limited to twelve students.

12. *What was the total percent of time spent in lab activities?* Answers ranged from 35 to 70 percent. Two teachers reported that they spent approximately 50 percent of the time in lab related activities.

13. *What do you estimate to be the total cost of starting this program?* Answers ranged from $3700.00 to $6,000.00.

Administrators were asked seven questions regarding the Biotechnology in Agriculture course. The results are given below.

1. *Do you perceive this course as being more applicable to science, more applicable to agriculture, or equally divided between the two? Why?* All administrators except two indicated that they felt the course was equally applicable to both courses, with the exception saying it was more applicable to upper level science or Biology II

2. *In your opinion, should there be prerequisites for this course, and if so, what?* All the administrators felt that students should be Juniors or Seniors who had had at least Biology I.

3. *Should students receive science credit for graduation for this course?* All administrators answered positively to this question, with one supporting his answer by saying that the students spend time in the lab equal to that of regular science classes.

4. *Should this course be given credit for college entrance requirements as a lab science course?* Again, all administrators answered yes, with one adding that the scientific knowledge students receive is probably more transferable than many science courses.'

5. *In your opinion, what are the students' perceptions of this course?* Administrators all agreed that students enjoyed the class, viewing it as a non-threatening higher-level science. They also said it was a good incentive for students to study science.

6. *How has the course enhanced education in your school?* Some of the responses included a closer working relationship between Ag and science teachers, science being available to more students, and increased self-confidence of students in taking other science courses. One administrator pointed out that it would add science options for smaller schools.

7. *In your opinion, what changes should be made in the course for next year?* Responses included shortening length of time for labs so that they could be completed in one class period and more advance notice of offering so that supplies could be gotten on time.

Conclusions and Recommendations

Based on the findings of the study, it was concluded that the Biotechnology in Agriculture course is very worthwhile and esteemed by all those who were involved in the pilot tests. The course definitely should be continued, and offered in more schools throughout the state and nation, in order to increase students' awareness of the subject. As with any pilot course, however, there were problems involved, and recommendations are given for correcting these in future programs.

Because the schools did not know whether or not they would be funded for the Biotechnology course, supplies could not be ordered early enough to ensure their arrival for use with the labs. This created a great deal of frustration among both students and teachers, as is evidenced by the responses given. One school even decided to discontinue the course after the first unit. It is recommended, therefore, that schools which desire to offer the course plan well in advance in order to have the supplies needed for each experiment.

Furthermore, teachers who plan to offer the course must be prepared to teach material which is possibly quite different from that which they have traditionally taught. Workshops, or a graduate level summer course, should be offered for those who feel the need to brush up on their science knowledge.

It is believed that their will be a significant difference in outcomes on the pre- and post-tests when the course is measured over a full year, with the necessary supplies and equipment available. Also, there were problems with the curriculum identified by the teachers, students, and administrators which should be corrected before the course is taught next year.

Finally, because of the problems associated with the first pilot test, it is recommended that the study be continued for an additional year to determine the actual effectiveness of the Biotechnology in Agriculture course. A standardized instrument to measure achievement in Biotechnology should be sought along with a better instrument to measure attitudes toward science.

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Pilot Evaluation of the Biotechnology in Agriculture Curriculum in Oklahoma: A Progress Report

A Critique

Michael E. Newman, Mississippi State University--Discussant

Evaluation studies of pilot programs are important research. This type of study has direct application to local practice--a feature missing in much agricultural education research. The results of this study can be used to improve and modify curriculum and determine policy at the state and local levels. I commend the researchers for doing this study.

The objectives of the study reflect careful thought on the part of the researchers. Three of the primary stakeholders of any educational program--students, teachers, and administrators--are included. The researchers also attempted to determine the amount of student learning and changes in student attitudes which took place in the programs.

One concern I have about this study is the lack of reliability information provided on the Biotechnology in Agriculture test and the inventory of student attitudes used. Both of the tests were used as a pretest and posttest measure, and both were apparently summed to a total score. Some measure of internal consistency is critical in evaluating the use of such a test. The researchers did recommend using better instrumentations in later studies.

The researchers described the procedures of the study adequately, noting the problem associated with not giving the pretests until November. They selected not to report the results of the achievement or student attitude toward science tests for this reason. As a result, objectives one and two were not discussed completely in the paper. I would like to see the results of at least the posttests, if the tests were deemed reliable.

Although the researchers mentioned that they assessed the science background of the students using scores from the Iowa Test of Basic Skills, they did not mention how this data was used. I believe that this data would make an excellent covariate for the achievement and attitude toward science tests.

The researchers completed objective three and reported the findings. The findings, however, were sometimes reported using quantitative and qualitative data, while at times only qualitative responses were reported.

The findings for objective four were not discussed in the paper.

Several conclusions and recommendations were appropriate, however, the recommendation on teacher inservice was not justified by the data given in the findings. Also, stating that the course should be offered in more schools around the state and nation goes beyond the scope of the study.

RELATIONSHIPS BETWEEN SELECTED HIGH SCHOOL VARIABLES AND COLLEGIATE ACADEMIC PERFORMANCE IN AGRICULTURE

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INTRODUCTION AND BACKGROUND

American high school educational quality was one of the most prominent issues during the 1980's. In addition to reform in high schools, admission requirements for entering freshmen within higher education institutions are increasing and omitting the vocational education phase of learning (Goertz and Johnson, 1985). It has been contended that it is the inability of students to do college work that prompted institutions of higher learning to tighten entrance standards (McCurdy, 1982).

Research indicates that academic achievement in college is positively related to the extent to which students complete a college preparatory curriculum in high school (Easton, 1970; Mitchell, 1985), and that academic performance in high school (grade point average or rank in graduating class) and scores on achievement and aptitude tests, such as the American College Test (ACT) and the Scholastic Aptitude Test (SAT), predict academic achievement in higher education (Easton, 1970; Mitchell, 1985; Sanford, 1982).

The prediction of a student's academic performance in college and their eventual academic success are two areas which have received considerable study from members of the higher education and secondary school communities (Fiske, 1989; Hays, 1988). Despite the enormous amount of time and energy that has been invested in college selection and placement, some students who have the intellectual ability to succeed academically at the college level do not (Bingaman, 1989).

Most research on predicting academic performance has focused on a limited number of intellective variables as they relate to academic performance and attrition (Rezak, 1988). Several studies have shown that it is more difficult to predict persistence than to predict academic performance, and suggestions have been made that a number of nonintellective variables should be studied in addition to intellective ones as predictors of both persistence and academic performance (Dorio et al., 1980). Merante (1983) also contended that prediction of collegiate success must include more than intelligence factors. He suggested that along with academic history, demographic variables (e.g., age, gender, birth order, family income, parents' education, religious/ethnic status) and geographical factors must be considered in predicting success in college.

Four background characteristics have been found to influence grades: (1) gender (Aitken, 1982; 1982; Pascarella, Smart, and Ethington, 1986); (2) scores on college entrance examinations (Aitken, 1982); (3) high school rank (Balkin, 1987; Crouse, 1986; Dreher and Singer, 1985;); and (4) high school grade point average (Bean and Bradley, 1986). It has been suggested by some researchers that along with academic variables, other variables should be considered (e.g., motivation, self-esteem, time, parents' education, number of parents in the household, religious and ethnic background, family income, birth order and geographic location) when predicting how well a student should perform in a higher education institution.

When dealing with intellective variables (e.g., high school grade point average, high school class rank, scores on the Scholastic Aptitude Test or the American College Test) studies are contradicting in determining which variable is the most accurate predictor of a students college grade point average.

PURPOSE AND HYPOTHESES

The major purpose of this study was to identify the most reliable predicting variable or the relationship, if any, between a number of predictive variables in order to develop a method of predicting a student's probable success or failure rate in the College of Agricultural Sciences at Texas Tech University.

The following hypotheses guided the development of this study and helped to reveal the strongest predicting variables.

Hypothesis 1. Student grade point average in high school is positively related to college grade point average and is a strong variable to consider when predicting college grade point average.

Hypothesis 2. The number of vocational agriculture units a student completes in high school is positively related to college grade point average in the College of Agriculture at Texas Tech University and can be used to predict academic performance.
Hypothesis 3. Scores on standardized tests (the Scholastic Aptitude Test and/or the American College Test) are positively related to college grade point average and can be used as a variable to predict academic performance.
Hypothesis 4. Females will have higher grade point averages in college than males.
Hypothesis 5. A student from a large high school will have a higher college grade point average than a student from a small school.

METHODS AND PROCEDURES

The study was conducted by collecting a select number of variables from student files. For the three years used in this study, 433 student files out of the 1167 were randomly selected for use in the study.

The instruments used in this study were two-part forms. The first part of the form was used to collect data about the student's high school history and the second part was used to collect certain collegiate variables.

The high school form was used to collect the following information: (a) student personal identification number, (b) student birthdate, (c) sex of student, (d) school size, (e) high school vocational agriculture units completed, (f) high school class rank, (g) number in graduating class, (h) cumulative grade point average, (i) scores on the American College Test and/or Scholastic Aptitude Test and (j) year admitted into the College of Agricultural Sciences at Texas Tech University.

Information collected concerning current college status included: (a) department within the College of Agricultural Sciences at Texas Tech University the student was enrolled in and (b) their major specialization, (c) the number of hours completed and (d) the grade received in the following disciplines at Texas Tech University: science and mathematics, English and speech, basic agriculture and upper level agriculture, (e) total credit hours earned, (f) current status (graduated from the College of Agricultural Sciences, not graduated but still enrolled in the College of Agricultural Sciences, withdrawn from the College of Agricultural Sciences, or placed on academic suspension), (g) final grade point average and (h) transfer credit hours including: total transfer hours, English/speech, mathematics, basic science and agriculture credits.

Frequencies and percentages were calculated from the resulting data and used to develop a profile of significant variables that can be used to predict the probable success or failure rate of entering students into the College of Agricultural Sciences at Texas Tech University.

The independent variables that were applied consisted of the following: gender, school size, number of high school vocational agriculture units completed, high school grade point average, scores on all categories of the American College Test(English, mathematics, natural science, social science and composite) and scores on all categories of the Scholastic Aptitude Test (Verbal and mathematics).

FINDINGS

According to the descriptive data that was collected and correlated in this study, the average student in the College of Agricultural Sciences at Texas Tech University is a male from a 2A school with no units of high school vocational agriculture completed. The average student achieved a grade point average of 86.6 or 2.9 in high school and had a composite score of 18 on the American College Test or a composite score of 874 on the Scholastic Aptitude Test. The average student is an Animal Science major and has a final college grade point average of 2.0. The average student came to Texas Tech University with no transfer hours and has completed an average of 79.3 hours at Texas Tech University. The average student will elect to leave the College of Agricultural Sciences at Texas Tech University before completing a degree program.

The stepwise multiple regression program that was conducted on the eleven independent variables yielded the following results.

High school grade point average was the most common independent variable that was found to be significantly related to college grade point average. High school grade point average correlated with college grade point average in science and math, college grade point average in basic agriculture courses, college grade point average in upper-level agriculture, and final cumulative college grade point average. The only dependent variable category not found to correlate with high school grade point average was college grade point average in English and speech.

Table 1 - Stepwise Multiple Regression of Grade Point Average in Science and Math Courses on Selected Variables

Independent Variables Entered Stepwise in Equation	R	R^2	R^2 Change	df	F
High School GPA	.425	.180	.180	(1,29)	06.39*

* $p \leq .05$

Table 2- Stepwise Multiple Regression of Grade Point Average in Upper Level Agriculture Courses on Selected Variables

Independent Variables Entered Stepwise in Equation	R	R^2	R^2 Change	df	F
High School GPA	.548	.300	.300	(1,29)	12.45*

* $p \leq .05$

Score on the American College Test Mathematics section was found to be significantly related to college grade point average in English and speech courses. No other variable was shown to correlate in the English and speech category and English and speech was the only category in which the American College Test Mathematics section was found to be statistically significant.

Table 3 - Stepwise Multiple Regression of Grade Point Average in English and Speech Courses on Selected Variables

Independent Variables Entered Stepwise in Equation	R	R^2	R^2 Change	df	F
ACT Math	.413	.170	.170	(1,29)	05.97*

* $p \leq .05$

The score on the American College Test Natural Science section was found to be significantly related to grade point average in basic agriculture courses. This was the only category that the score on the American College Test Natural Science section was found to correlate.

Table 4 - Stepwise Multiple Regression of Grade Point Average in Basic Agriculture Courses on Selected Variables

Independent Variables Entered Stepwise in Equation	R	R^2	R^2 Change	df	F
ACT Natural Science	.508	.258	.258	(1,29)	10.07*

* $p \leq .05$

High school grade point average was also found to be related to college grade point average in basic agriculture courses. This variable was found to be statistically significant when Scholastic Aptitude Test scores were included in the equation.

Table 5 - Stepwise Multiple Regression of Grade Point Average in Basic Agriculture Courses on Selected Variables

Independent Variables Entered Stepwise in Equation	R	R^2	R^2 Change	df	F
High School GPA	.503	.253	.253	(1,29)	09.80*

* $p \leq .05$

High school grade point average as well as score on the Verbal section of the Scholastic Aptitude Test were found to be significantly related to final cumulative grade point average. It was found that high school grade point average, which accounted for twenty-five percent of the variance in final cumulative college grade point average, coupled with the score on the Scholastic Aptitude Test Verbal section increased the predictive validity of the two variables to account for thirty-three percent of the variance. It should be noted that adding the Scholastic Aptitude Test Verbal section to high school grade point average increased the predictive validity of high school grade point average by only eight percent.

Table 6 - Stepwise Multiple Regression of Final College Grade Point Average

Independent Variables Entered Stepwise in Equation	R	R^2	R^2 Change	df	F
High School GPA	.501	.251	.251	(1,45)	15.08*
SAT Verbal	.575	.331	.080	(2,44)	10.86*

* $p \leq .05$

Gender, school size, number of high school vocational agriculture units completed, American College Test English section, American College Test Social Science section, and American College Test Composite score were all independent variables that were not found to be correlated to any of the dependent variables in this regression analysis.

CONCLUSIONS RELATED TO HYPOTHESES

The following conclusions are based on interpretations of the data presented in this study. It should be made clear that these conclusions are based on the amount of information available at the time of the study and do not account for missing data. The following conclusions are limited to Texas Tech University students enrolled in the College of Agricultural Sciences from the years 1986, 1987 and 1988.

Hypothesis 1. Student grade point average in high school is positively related to college grade point average and is a strong variable to consider when predicting college grade point average.

This hypothesis is accepted according to the research conducted in this study.

The results of the SPSS* multiple regression involving the data of this study found that there is a significant positive relationship ($p \leq .05$) between high school grade point average and academic performance, specifically cumulative college grade point average.

From the five areas that the selected variables were applied, high school grade point average was found to be significant in all but one of the areas studied. High school grade point average was found to be significant in the following areas: science and mathematics, basic agriculture, upper level agriculture and final grade point average.

High school grade point average is the most valid and accurate predictor of academic performance out of all the independent variables applied in this study and should be used as a predictive variable when attempting to predict college grade point average.

Hypothesis 2. The number of vocational agriculture units a student completes in high school is positively related to college grade point average in the College of Agriculture at Texas Tech University and can be used to predict academic performance.

This hypothesis is rejected based on the finding of this study.

The stepwise multiple regression run found that there is no significant relationship ($p \leq .05$) between the number of high school vocational agriculture units completed and college grade point average.

Vocational agriculture units completed in high school did not correlate with any of the five areas to which it was applied and was found to have no predictive value.

The number of vocational agriculture units completed in high school has no predictive value and should not be considered when predicting academic performance.

Hypothesis 3. Scores on standardized tests (the Scholastic Aptitude Test and/or the American College Test) are positively related to college grade point average and can be used as a variable to predict academic performance.

This hypothesis is partially rejected based upon the stepwise multiple regression that was run on the data collected.

The Scores on the Scholastic Aptitude Test and the American College Test were found to be significant ($p \leq .05$) in only three of the areas studied.

Scores on the American College Test Natural Science section were found to have a positive relationship to grades earned in basic agriculture. This is the only section of the American College Test that correlated with a related category (Natural Science to Agricultural Science) in the study. This section of the American College Test was not found to be significant in any of the other four areas.

Score on the American College Test Mathematics section was found to be positively related to college grade point in the English and speech category. The American College Test Mathematics section correlating with the English and speech category is not logical and does not follow the design of the American College Test as a predictive tool. If the American College Test was a valid predictor of academic performance, the Mathematics section should have correlated with the science and math category instead of an unrelated category such as English and speech.

No other section of the American College Test was found to be significant to the English and speech category, nor was American College Test Mathematics section found to correlate with any of the dependent variables entered into this regression.

Score on the Scholastic Aptitude Test Verbal section was found to be significantly related to final college grade point average when coupled with high school grade point average. However, adding the Scholastic Aptitude Test Verbal section only added an additional eight percent to the existing twenty-five percent of the validity already accounted for by high school grade point average. This finding indicates that the Scholastic Aptitude Test is not an accurate predictor of academic achievement.

It can be concluded that scores on the Scholastic Aptitude Test and the American College Test have limited predictive validity at best. Only two sections of the five possible on the American College Test and only one of the two sections of the Scholastic Aptitude Test correlated at all and no section correlated more than once on either test. The American College Test correlated with only two of the dependent variables in this study, and only one of those variables were in an area of like subject matter.

The Scholastic Aptitude Test correlated in only one section, final cumulative college grade point average. Coupled with high school grade point average it added only eight percent validity to the existing twenty-five percent contributed to high school grade point average.

The American College Test Composite score is not a valid predictor. However, this test may have some predictive validity within the subtests. American College Test Natural Sciences section was found to be significantly related to grade point average in basic agriculture. Since basic agriculture courses are science related, this finding is logical and adds validity to the concept of using the American College Test as a predictive variable for academic performance. If any section of the American College Test is going to be used to predict academic performance in the College of Agricultural Sciences, the Natural Science subtest is the one that should be used.

The Scholastic Aptitude Test and the American College Test were originally designed to predict academic performance. Neither test was shown to be a consistent or accurate predictor of academic performance and neither test should be used in predicting academic performance or in the admissions process. If the American College Test is going to be used in predicting academic performance in the College of Agricultural Sciences at Texas Tech University, only the score on the Natural Sciences section should be utilized. The Scholastic Aptitude Test has no predictive validity alone and should not be used in the admissions process unless it is coupled with other variables such as high school grade point average.

Hypothesis 4. Females will have higher grade point averages in college than males.

This hypothesis is rejected based upon the conclusion made within this study.

The information gained through the stepwise multiple regression performed on the gender of the student showed no relationship ($p \leq .05$) between the gender of the student and college grade point average.

The information gained in this study shows that gender does not influence college grade point average. Gender has no significant value when attempting to predict college grade point average and should not be used in any way when attempting to predict college grade point average.

Hypothesis 5. A student from a large high school will have a higher college grade point average than a student from a small school.

Hypothesis 5 is rejected based upon the findings of this study.

School size was found to have no significant relationship ($p \leq .05$) to college grade point average. It was not found to be significant in any of the areas studied.

School size does not hinder nor enhance academic performance. School size should not be used as a variable in predicting college grade point average.

RECOMMENDATIONS

The following recommendations pertaining to the College of Agricultural Sciences at Texas Tech University are made by the researcher as a result of having conducted the study.

1. When attempting to predict the success or failure of potential students for admission into the College of Agricultural Sciences at Texas Tech University, no one variable should be used in the admission process. Although high school grade point average was found to be significant in the majority of the categories studied, it can not be stated with certainty that a student with a high grade point average in high school will have a high cumulative grade point average in college, or vice-versa. A number of variables should be considered when attempting to predict academic performance. One of the variables that should be taken into consideration with other student variables is high school grade point average.
2. Standardized tests should not be used as predictive variables when determining admission status of potential students. Neither the American College Test nor the Scholastic Aptitude Test were found to be valid overall and, at best, should be used only in conjunction with other student variables.
3. A student's high school vocational agriculture history should not be used to predict success in the College of Agricultural Sciences at Texas Tech University. Units of vocational agriculture completed were not shown to hinder or enhance collegiate success in any way.
4. Neither gender nor school size should be of any consideration in the admission process or in the attempt to predict academic performance. Neither of these two variables play any part in a student's success or failure within the College of Agricultural Sciences at Texas Tech University.

Recommendations for Further Research

1. Further research should be conducted in a setting where all the information that is needed in the areas of both high school history as well as a complete college history can be located. This would eliminate the problem of missing data and add validity to the study.
2. Further studies should be conducted to determine the other variables that are related to success in college. It is conceivable that attributes such as student self-esteem and motivation, family aspirations and expectations, and sociocultural background may be responsible for some degree of collegiate success.

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RELATIONSHIPS BETWEEN SELECTED HIGH SCHOOL VARIABLES AND COLLEGIATE ACADEMIC PERFORMANCE IN AGRICULTURE

A Critique

Joe W. Kotrlik, Louisiana State University--Discussant

I commend the authors for addressing the relationship between selected variables and collegiate academic performance in agriculture. This is a worthwhile and timely research topic.

The authors provided a well organized review of literature that was written with appropriate depth and scope. The review provided an appropriate foundation for the study itself and provided support for the variables and procedures selected for use in the study.

I have several questions for the authors. 1) How was sample size determined? The authors report that 433 student files were randomly selected out of 1167. It appears that this sample size may be excessive. Did the authors incorporate design factors that were not evident in the manuscript that would justify this sample size. 2) Were differences in difficulty levels of collegiate math, English, and other courses taken into consideration in the data collection and analysis process? On most university campuses, multiple math courses are available. There is no indication in the manuscript that the students all enrolled in exactly the same courses. 3) Were ACT or ENACT scores used? There is no indication in the manuscript whether the old ACT or the new enhanced ACT scores were used. There is no indication that steps were taken to ensure that the same scores were collected on all students. 4) Why did the authors repeatedly refer to correlations between variables when they were discussing stepwise regression analysis rather than discussing the predictive power of the independent variables(s). 5) The authors concluded in Conclusion 3 that the ACT test is not a valid predictor. Unfortunately, the authors cannot answer this question in this study since this study was based only on university students. The ACT does not claim to predict academic performance, only the potential for success in a university environment. Likewise, Recommendation 2 is invalid. 6) The authors are not specific in discussing missing data and its impact on this study. This is mentioned twice in this manuscript but no specific information was provided. 7) I suggest that the authors provide a table a table showing correlations among the variables studied. I would also suggest that the authors follow APA style by placing the appropriate table references where appropriate in the manuscript. The manuscript was very difficult to follow due to the lack of references to specific tables.

I commend the writers for conducting this study and encourage them to conduct additional research relative to the variables that help explain academic performance in colleges of agriculture. Although several areas of concern were raised in the methodology, the conceptual base and general design of this study were appropriate.

SAFETY COMPLIANCE OF SELECTED SECONDARY AGRICULTURAL MECHANICS LABORATORIES

by

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INTRODUCTION AND THEORETICAL FRAMEWORK

It is a common fact that today's students are tomorrow's workers. These students must develop necessary safety attitudes and consciousness in the work place. Accidents occurring in the work place severely affect not only the individual, but also society as a whole. The Occupational Safety and Health Act stated that,

> ...personal injuries and illnesses arising out of work situations impose a substantial burden upon, and are a hindrance to interstate commerce in terms of lost production, wage loss, medical expenses, and disability compensation payment (1970, p. 1).

In the context of secondary agricultural science programs, Bekkum and Hoerner (1980) stressed that it is the responsibility of teachers to provide necessary instruction to develop safe and skillful working habits. Daniels (1980) supported this statement by stating that the general perception of the public is that teachers are held responsible whenever accidents occur in the laboratory. According to Phipps and Osborne (1988), teachers may be found negligent if they fail to protects student from unnecessary risks, do not act reasonably in a given situation, or if they allow a third person to engage in an activity that might cause injury to others.

Lee (1980) stated that proper installation and maintenance of equipment are the basis for safety in agricultural laboratories. Furthermore, he stressed the importance of designing laboratory facilities with a minimum of safety hazards. However, various studies (Lawver, 1992; Miller, 1991; Fletcher & Johnson, 1990; Gliem & Hard, 1988) have shown that recommended safety practices are not being completely practiced in secondary agricultural science laboratories.

In a study conducted by Lawver (1992), 237 Texas agricultural science teachers replied to a questionnaire that solicited demographic information and responses concerning safety practices. Of the teachers who responded, 95.4% conducted demonstrations on the safe use of hand tools and 94.5% conducted demonstrations on the safe operation of power tools. However, only 30.8% conducted scheduled safety inspections. Other unsafe conditions were found to exist in many Texas secondary agricultural mechanics laboratories. In a similar study by Fletcher and Johnson (1990), only 43.5% of 134 agricultural science teachers in Mississippi conducted scheduled safety inspections. It is recommended by the National Institute for Occupational Safety and Health (NIOSH) (1979) that the supervisors (teachers) conduct daily or weekly informal inspections to ensure the safety of students working and learning in these facilities.

In another study conducted by Miller (1991), 21 high schools in Maricopa and Pima Counties, Arizona, were surveyed to determine the safety compliance rate in the vocational education laboratories. It was found that there was a wide variation between schools with the highest compliance overall being 94.7% and the lowest being 32.03%. Gliem and Hard (1988) found that none of the 145 Ohio agricultural mechanics laboratories were in total compliance with safety standard. Miller (1991) stressed that there are no acceptable reasons for failure to comply at a level of 100% in areas of medical first aid, personal protective equipment, and fire protection.

Adequately and properly maintained laboratory facilities are critical to ensure the safety of students as well as teachers. Gliem and Hard (1988) stated that teachers of vocational agriculture are extremely vulnerable to charges of negligence and subsequently liable if a student accident leads to student injury. There are individuals, especially parents,

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who would take any opportunity to bring a lawsuit against teachers who are responsible for their children's welfare.

PURPOSE AND OBJECTIVES

The purpose of this study was to observe the safety conditions of secondary agricultural mechanics laboratories within a forty-mile radius of Lubbock, Texas. The study was designed to provide basic information from which teachers can determined areas of safety that need to be improved. To accomplish the purpose of the study, the following objectives were identified.

1. To determine the overall safety compliance with recognized safety standards in secondary agricultural mechanics laboratories within a forty-mile radius of Lubbock, Texas.
2. To identify areas of safety which should be given more attention by agricultural science teachers.
3. To identify areas of safety where in-service education is needed to help agricultural science teachers become more aware of the expected safety practices.

METHODS AND PROCEDURES

Research Design. Descriptive research methods were used for this study which was designed to gain information about the safety status of agricultural mechanics laboratories. This method was said to be "a picture in time" that described the nature of a situation as it exists at the time of the study. There were no manipulation or control of the variables and no hypotheses were developed or tested. The data collected will be used for further review and improvement of investigated school facilities. The study also intended to identify areas of safety that need serious attention from instructors and administrators.

Instrumentation. This study utilized a survey instrument developed by Lawrence B. Everett . This instrument had been used previously by other researchers (Gliem & Hard, 1988; Miller, 1991) with some modifications. This research was conducted on site by the researcher. The instrument divided safety in agricultural mechanics laboratories into ten major areas. These areas included:

1. Walking-working surfaces;
2. Means of egress;
3. Fire protection;
4. Medical and first aid;
5. Personal protective equipment;
6. Tools;
7. Welding, cutting, and brazing;
8. Electrical;
9. Compress air equipment; and
10. Environmental control.

Each major area had a sub-scale of items that was designated as "N" for not observed, "Y" for observed, and "NA" for not available according to the standard set by the OSHA. Not all items had the option not available (NA). For example, some schools might not have a radial arm saw, but all schools should have properly maintained washing and clean-up facilities.

Each item on the scale was given a numerical value from 0 to 10. Zero indicating no importance to laboratory safety and 10 indicating the most importance. For example, laboratory appearance was rated 9.09, compared to aisles properly indicated which was rated 6.00. These values reflected the average rating of importance assigned by a panel of ten safety specialists.

A reference was also provided on every item as stated in the Code of Federal Regulation (1991). For example, under the area of walking-working surfaces, item number 1 which stated: *1. Laboratory appearance neat and orderly. 1910.22(a),* 1910.22(a) meant that the reference can be found under CFR part 1910 section 22(a).

Subject Selection. The populations of this study was limited to agricultural mechanics laboratories within a forty-mile radius of Lubbock. The reason for this distance limitation was to accommodate the travel time of the researcher. Twenty-nine schools were identified in this area. Data were collected in March and April of 1992. Data were collected on Wednesdays and Fridays until data collection at all laboratories in the study were completed.

Data Analysis. Data collected were recorded by adding all the Y values and subtracting with the N values. NA was assigned zero value. For example:

+ 9.09 N Y 1. Laboratory appearance neat and orderly. (9.09 possible)
- 6.00 N Y 2. Aisles properly indicated. (6.00 possible)
0.00 N Y NA 3. Fixed stair provided. (7.55 possible)
+ 3.09

The net score for the above example was 3.09.

The net score and percentage of the score were recorded. The frequency of each score was recorded to determine the pattern and level of safety in all the twenty-nine schools. The frequency of each item was also recorded. These data helped to further explain the findings.

FINDINGS

Table 1 shows the compliance scores and percentages for each of ten major areas of laboratory safety in each participating school while Table 2 shows the data collected in the area of walking-working surface, means of egress, fire protection, medical and first aid, and personal and protective equipment in summary form. The average score in the area of "walking-working surface" was 61.8 (61.7%). The highest score was 100.1 (100%) and the lowest score was -12.4 (0%). In the area of "means of egress" the average score was 8.36 (20.5%). The highest score was 40.82 (100%) and the lowest score was -4.1 (0%). The overall score in the area of "fire protection" was 25.9 (32.4%), the highest score was 63.0 (79.0%) and the lowest score was -10.0 (0%). The average score in the area of "medical and first aid" was 6.2 (23.0%). The highest score was 8.0 (30%) and the lowest score was -19.1 (0%). In the area of "personal protective equipment" the average score was 20.6 (52.5%). The highest score was 39.3 (100%) and the lowest score was 0 (0%).

Table 1 - Compliance Scores and Percentages for Each Participating School.

School	Working Surface		Means of Egress		Fire Protection		Medical& First Aid		Personal Prot. Equip.		Tools		Welding, Cutting& Brazing		Electrical		Compressed Air Equip.		Environ. Control	
	Score	%	Score	%	Score	%	Score	%	Score	%	Score	%	Score	%	Score	%	Score	%	Score	%
1	70.4	70	-4.1	0	8.6	11	8.0	30	39.3	100	167.1	86	85.0	90	49.6	74	35.1	100	73.5	66
2	82.4	82	-4.1	0	46.8	58	8.0	30	39.3	100	167.1	86	85.0	90	67.4	100	35.1	100	83.1	75
3	70.6	71	11.9	29	8.6	11	8.0	30	19.9	51	119.9	62	85.0	90	67.4	100	35.1	100	92.8	83
4	-12.4	0	-4.1	0	46.8	58	-9.8	0	19.9	51	103.6	54	47.9	50	48.1	71	17.1	49	65.5	59
5	100.1	100	40.8	100	62.3	78	8.0	30	19.9	51	138.2	71	76.7	81	67.4	100	35.1	100	102.1	92
6	54.9	55	40.8	100	46.8	58	8.0	30	19.9	51	167.1	86	47.2	50	67.4	100	17.1	49	83.1	75
7	47.1	47	24.8	66	46.8	58	8.0	30	0.0	0	154.7	80	47.7	50	30.3	45	35.1	100	65.2	58
8	82.4	82	24.8	66	26.3	33	8.0	30	19.9	51	150.0	76	76.1	80	67.4	100	35.1	100	92.1	83
9	12.2	12	24.8	66	46.8	58	8.0	30	19.9	51	63.7	33	38.8	41	67.4	100	35.1	100	101.7	91
10	37.1	37	-4.1	0	9.7	12	8.0	30	19.9	51	129.3	67	75.9	80	67.4	100	35.1	100	101.7	91
11	91.2	91	-4.1	0	46.8	58	8.0	30	19.9	51	145.8	75	85.0	90	67.4	100	35.1	100	101.7	91
12	62.8	63	10.8	27	8.6	11	8.0	30	39.3	100	148.0	76	36.5	38	49.6	74	35.1	100	83.1	75
13	70.4	70	-4.1	0	9.4	12	8.0	30	19.9	51	129.3	67	75.6	80	67.4	100	35.1	100	101.7	91
14	47.4	47	24.8	66	8.6	11	8.0	30	19.9	51	148.2	77	75.9	80	67.4	100	0.0	0	83.1	75
15	95.5	96	32.8	80	63.4	79	8.0	30	39.3	100	160.9	83	66.7	70	67.4	100	26.1	73	101.7	91
16	62.8	63	-4.1	0	8.6	11	-9.1	0	0.0	0	75.5	39	66.6	70	48.1	71	0.0	0	55.7	50
17	62.8	63	-4.1	0	-10.5	0	8.0	30	19.9	51	112.9	58	55.9	59	49.6	74	35.1	100	101.7	91
18	72.6	73	-4.1	0	25.2	32	8.0	30	19.9	51	145.8	75	66.3	70	67.4	100	35.1	100	101.7	91
19	82.4	82	-4.1	0	5.9	7	8.0	30	19.9	51	119.1	62	65.4	69	49..6	74	35.1	100	101.7	91
20	47.4	47	10.8	27	46.8	58	8.0	30	19.9	51	113.1	58	67.4	71	67.4	100	35.1	100	82.6	77
21	82.4	82	24.8	66	46.8	58	8.0	30	0.0	0	184.0	95	75.9	80	67.4	100	35.1	100	83.1	75
22	47.4	47	-4.1	0	8.6	11	8.0	30	19.9	51	84.8	44	46.8	49	67.4	100	35.1	100	101.7	91
23	54.9	55	-4.1	0	8.6	11	8.0	30	19.9	51	131.8	68	84.0	89	67.4	100	35.1	100	101.7	91
24	54.9	55	-4.1	0	27.4	34	8.0	30	19.9	51	101.1	52	58.4	61	67.4	100	17.1	49	83.1	75
25	66.0	66	10.8	27	8.6	11	8.0	30	19.9	51	113.1	58	75.9	80	67.4	100	35.1	100	101.7	91
26	62.8	63	-4.1	0	24.1	30	-9.8	0	19.9	51	129.3	67	75.9	80	49.6	74	35.1	100	73.6	66
27	88.1	88	-4.1	0	8.6	11	8.0	30	19.9	51	158.8	85	85.0	90	67.4	100	35.1	100	101.7	91
28	47.4	47	-4.1	0	46.8	58	8.0	30	19.9	51	167.1	86	67.0	71	67.4	100	0.0	0	101.7	91
29	36.4	36	24.8	66	8.6	11	8.0	30	19.9	51	121.2	63	66.1	70	67.4	100	35.1	100	101.7	91

Table 2. The Highest, Lowest, and Average Score in the Area of Walking-Working Surface, Means of Egress, Fire Protection, Medical and First Aid, and Personal Protective Equipment

Area	Net Score	Highest Score	Freq.	Lowest Score	Freq.	Average Score
Walking-Working Surface	100.1	100.1	1	-12.4	1	61.8
Means of Egress	40.8	40.8	2	-4.1	16	8.4
Fire Protection	79.9	63.0	1	-10.0	1	25.9
Medical and First Aid	26.9	8.0	26	-9.8	2	6.2
Personal Protective Equipment	39.3	39.3	4	0.0	3	20.6

As shown in Table 3, the average score in the area of "tools" was 132.8 (68.6%). The highest score was 184.0 (95.1%) and the lowest score 63.7 (32.9%). The average score in the area of "welding, cutting, and brazing" was 67.6 (71.2%), the highest score was 85.0 (71.2%) and the lowest score was 36.5 (38.4%). The overall score in the area of "electrical" was 61.7 (91.5%). The highest score was 67.4 (100%) and the lowest score was 30.3 (44.9%). The average score in the area of "compressed air equipment" was 29.3 (83.5%). The highest score was 35.1 (100%) and the lowest score was 0 (0%). In the area of "environmental control" the overall score was 90.5 (81.3%). The highest score was 102.1 (91.8%) and the lowest score 55.7 (50.1%).

Table 3. The Highest, Lowest, and Average Score in the Area of Tools, Welding, Cutting and Brazing, Electrical, Compressed Air Equipment, and Environmental Control

Area	Possible Score	Highest Score	Freq.	Lowest Score	Freq.	Average Score
Tools	193.6	184.0	1	32.9	1	132.8
Welding, Cutting, and Brazing	94.9	85.0	5	36.5	1	67.6
Electrical	67.4	67.4	22	30.3	2	61.7
Compressed Air Equipment	35.1	35.1	22	0.0	3	29.3
Environmental Control	111.3	102.1	1	55.7	1	90.5

Overall Score Based on Individual Schools

As shown in Table 4, there was a wide variation between overall percentage score between schools. The average score of all schools was 504.79 (63.96%). The highest score was 661.60 (83.83%) and the lowest score was 304.11 (38.53%).

Table 4. Overall Score Based on Individual School

School	Score	Percentage	School	Score	Percentage
1	532.45	67.46	16	304.11	38.53
2	610.09	77.30	17	431.90	54.72
3	519.30	65.80	18	537.96	68.16
4	335.05	42.45	19	482.97	61.20
5	650.68	82.44	20	498.50	63.16
6	552.42	69.99	21	607.49	76.97
7	459.73	58.25	22	415.62	52.66
8	582.06	73.75	23	507.43	64.29
9	418.41	53.01	24	433.27	53.90
10	480.06	60.83	25	506.62	64.19
11	596.92	75.63	26	456.45	57.83
12	481.78	61.04	27	568.58	72.04
13	512.62	64.95	28	521.25	66.05
14	483.41	61.25	29	489.25	61.99
15	661.60	83.83			

Total possible score = 789.23, overall score = 504.79 (63.96 %)

CONCLUSIONS AND RECOMMENDATIONS

Based on the data collected, the following conclusions were derived.

1. Overall safety compliance in the agricultural mechanics laboratory within a forty-mile radius of Lubbock is inadequate. None of the schools scored 100% in the overall score and majority of the schools scored below 70% in the overall score.

2. Teachers of agricultural science should give more attention to all areas of safety. However, the data shows that conditions are particularly deficient in the areas of "means of egress," "personal protective equipment," "fire protection," and "medical and first aid."

3. In-service education should be provided in all areas of laboratory safety. Opportunities should be given to teachers so that they may increase their awareness toward safety and what is expected from them.

Based on this study, the following recommendations were made:

1. Each participating school should be provided with their score along with suggestions for upgrading the condition of their laboratory.

2. Follow-up studies should be conducted to the schools being investigated.

3. Similar studies should be done to include all agricultural mechanics laboratories in Texas.

4. Research should be conducted to determine why the teachers failed to comply with accepted safety standards.

5. Data regarding accidents in agricultural mechanics laboratories should be compiled so that necessary steps can be taken to reduce the number of accidents.

6. All agricultural science programs should conduct regular safety inspections of their laboratories. To aid in these inspections, a checklist should be developed that includes all areas addressed in this study. Once completed, these checklists should be filed in at least departmental and school records and perhaps kept on file at the State Department of Education.

7. Consideration should be given to possible monitoring and enforcing of safety standards by local and/or state agencies. As evidenced by the findings of this study, far too few teachers are maintaining adequate standards of safety.

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SAFETY COMPLIANCE OF SELECTED SECONDARY AGRICULTURAL MECHANICS LABORATORIES

A Critique

Glen C. Shinn, Clemson University--Discussant

Abraham Maslow recognized safety as a fundamental need of humans superseded only by psychological or survival needs. Malcolm Knowles synthesized the literature related to human behavior and included security and safety as a principle variable. The researchers have selected a basic problem, conducted an appropriate literature review, and developed a sound theoretical framework. The paper is very well organized with clear, crisp writing and reporting.

The methods and procedures were appropriate for the purpose and objectives of the research. The design was sound and instrumentation was valid. The researchers are commended on using a standard instrument which allows meta-analyses across similar research. The sampling procedures and statistical analysis were clear and appropriate. The findings were presented in a direct manner using both descriptive and quantitative methods. The tables were very well organized and presented.

The conclusions extend directly from the findings and are presented succinctly. Conclusions 1 and 2 are consistent with the data and previous research professionals are concerned about the safety of people and dedicate time to provide for a safe environment. Conclusion 3 recommends in-service education to increase teacher awareness and clarify expectations. The conclusion infers teachers need more knowledge. Research indicates teachers have both a knowledge of safety standards and access to regulations. In-service education techniques should address the affective behaviors of teachers, especially valuing, organization, and characterization by value complex.

Recommendation 1 is sound and provides knowledge of results and corrective feedback. Recommendation 2 infers a compliance check which may be beyond the sphere of responsibilities of the researchers or their colleagues. Recommendation 3 should be re-considered; what evidence would lend support for differences among the 1,200 Texas schools with agricultural education? Recommendation 4 proposes to examine the reasons for noncompliance of accepted safety standards by teachers. In my opinion, this is the most significant recommendation growing from this research experience. The recommendation gives rise to a new research problem; what are the teacher attitudes which affect safety and health of people? Recommendation 5 goes beyond this study; there was no evidence included in this investigation of accidents occurring in the agricultural mechanics laboratories. Recommendation 6 is a sound educational practice and several checklists are currently available. Recommendation 7 tends to move the responsibilities of human safety to one of monitoring and enforcing. Perhaps a higher road would be to empower the local teacher with professional and fiscal authority to assure a safe learning environment for every person.

SOUTHERN REGION READERSHIP SURVEY OF THE FFA NEW HORIZONS MAGAZINE

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SOUTHERN REGION READERSHIP SURVEY OF THE FFA NEW HORIZONS MAGAZINE

INTRODUCTION

In the past several years, numerous changes have occurred within agricultural education and the FFA. The agricultural education profession has moved from a predominantly production orientation to a more comprehensive agriscience focus; the Future Farmers of America is now named the National FFA Organization; the national headquarters has a new organizational structure and the National Future Farmer has become FFA New Horizons. These changes and others reflect and underscore the importance of understanding the various publics served by agricultural education and the FFA.

This is particularly true of the FFA New Horizons magazine, perhaps the most important public relations vehicle used by the National FFA Organization. In order to ensure the long-term efficacy of FFA New Horizons, its writers and editors must continually monitor readers' perceptions, attitudes and uses of the magazine.

THEORETICAL FRAMEWORK

The effectiveness of a publication greatly depends on how it reflects the interests of its readers. Unfortunately, the editor of a magazine has no easy way to obtain detailed and comprehensive feedback from the magazine's readers. A number of studies have shown that editors sometimes lack a clear perception of what their readers want (Wink, 1979). Letters to the editor are a common but unsystematic method of determining reader interest. They do not represent those readers who have strong opinions but do not care to write. Moreover, they tend to reflect attitudes and opinions about issues rather than perceptions about magazine form and content, per se. Attempts to gather readership data with survey research are rare (Wink, 1979).

According to Redding (1982), audience surveys can help maintain or open feedback channels so that a publication can remain responsive to its readers. Surveys enable editors and communications' managers to gather information about their audiences so they can more closely correlate editorial content to reader needs, expectations and interests (Dreyer, 1984; Tucker & Cooper, 1987; Suvedi, et.al, 1991).

A survey is a valuable tool in analyzing reader opinion. A well designed readership survey, based on sound research principles, can yield more reliable information than occasional letters and reader comments. Based on this information, editors can make their publications more effective.

PURPOSE AND OBJECTIVES

This study was conducted to determine the appropriateness of FFA New Horizons to its readership in the FFA's southern region. The specific objectives of the study were:

1. Determine demographic information of FFA New Horizons southern region readers.
2. Ascertain southern region readers' utilization of the FFA New Horizons magazine.
3. Determine southern region readers' preferences for career development information in the FFA New Horizons magazine.
4. Determine FFA New Horizons value to its readers in the southern region.

METHODS AND PROCEDURES

The research design used for this study was a descriptive survey design. A focus group was used to assist in the development of the research instrument and to provide qualitative data for the study. The focus group was designed to tap the experiences, skills or feelings of participants. A field test was conducted in October of 1991 with Michigan FFA members to assure the usability and validity of the technique. A month later, a southern region focus group convened during the 1991 National FFA Convention. The nominal group consisted of selected southern region FFA members who were nominated by state supervisors for agricultural education. The results of the focus group, coupled with the researchers' previous work in this area, provided the most relevant questions for the survey.

Survey validity was established using a panel of experts that consisted of the FFA New Horizons' staff, the 1991-92 Michigan State FFA Officers, and faculty from the Department of Agricultural and Extension Education at Michigan State University. Reliability was established by a pilot test with a like group of students and advisors not in the sample. Reliability coefficients ranged from .65 to .94.

Systematic random sampling was used to select 233 southern region FFA members and 90 southern region FFA advisors from the FFA New Horizons' mailing list. The Total Design Method (TDM) (Dillman, 1978) was utilized. A mail questionnaire was used to collect data. The questionnaires were mailed to the sample population on February 14, 1992. A follow-up postcard was mailed one week later, followed by a second mailing of the questionnaire on March 2, 1992. A third follow-up mailing was sent to the non-respondents on March 18, 1992. Early and late respondents were compared to ensure generalizability to the population. Research has shown that late respondents are similar to non-respondents (Miller & Smith, 1983). Because there was no difference between early and late respondents, the results to this survey can be generalized to the population.

Data were analyzed using the Statistical Package for the Social Science (SPSS/PC+). The .05 level of significance was selected for use in interpreting the findings of the study. Frequencies, means, standard deviations, analysis of variance (ANOVA), and T-tests were used to analyze data.

RESULTS

A total of 134 FFA members and 65 FFA advisors returned completed questionnaires for a combined response rate of 62%. Because of missing data, totals do not always equal the number of respondents. Over 73% of FFA members and over 92% of FFA advisors were male. Figure 1 shows the gender of southern region FFA members and advisors who responded to the survey. The average age of respondents was 16½ years for FFA members and 39 years for FFA advisors.

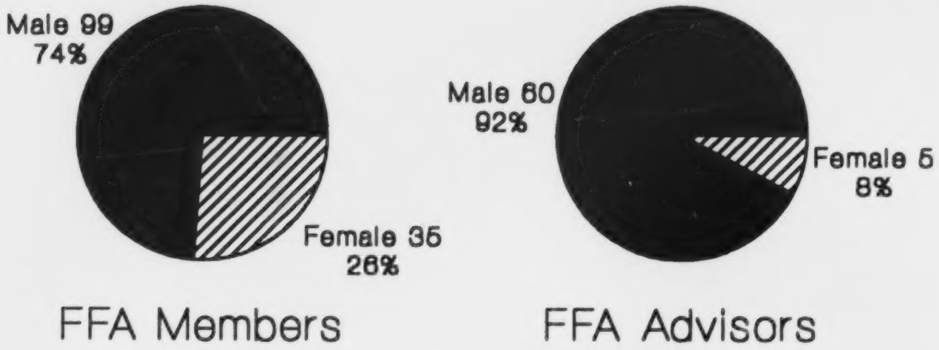

Figure 1. Gender of southern region FFA members and advisors.

The survey found that 77% of the FFA members and 86% of the FFA advisors read at least 50% of the magazine. Only 4.5% of the FFA members did not read FFA New Horizons. All FFA advisors read at least some of the magazine. Figure 1 illustrates what percentage of FFA New Horizons members and advisors read.

Both FFA members and advisors responded that topics of personal interest, photographs, article title, and state topics were quite important in determining which articles they will read. FFA members also thought regional topics were quite important. Article length, photo captions were listed as being important factors in determining which articles FFA members and advisors read.

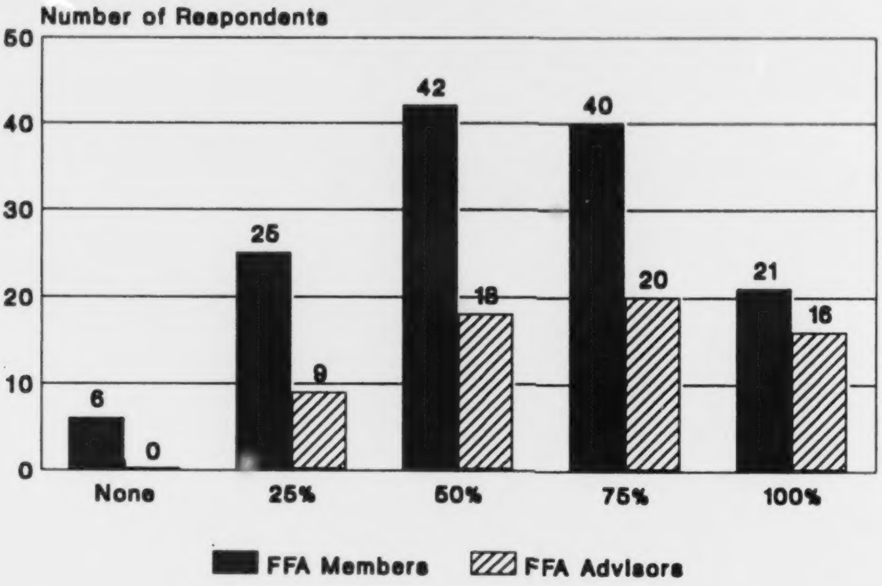

Figure 2. Percentage of FFA New Horizons read by southern region FFA members and advisors.

FFA members and advisors both stated they would like more career information articles included in the magazine. FFA advisors would also like to see more articles on FFA success stories in the magazine. Respondents were pleased with the amount of information on colleges/universities, urban articles, rural articles, national officer articles, and regional FFA information that was published in recent issues of the magazine.

When asked how often they read various sections, FFA members and advisors indicated they frequently read the "FFA in Action," cover story, features, FFA/careers section, "Chapter Scoop," "Looking Ahead," advertisements, and the joke page. FFA advisors also stated they frequently read "News in Brief," "Mail Bag," and "Front Line."

When considering the layout of the magazine, FFA members and advisors felt the photographs, headlines, story length, graphics, letter size, page arrangement, advertisements, paper quality, and writing quality were all good. Respondents agreed that writing quality, paper quality, and photographs deserved the highest rating among layout components.

The FFA members and advisors were asked to compare the FFA New Horizons magazine to other magazines they read. Respondents rated the magazine on a zero to 10 scale, with 10 being the high. Both FFA members and advisors rated the FFA New Horizons a seven when compared to other magazines they regularly read. Means, standard deviations, minimum and maximum ratings from FFA members and advisors are shown in Table 1.

Table 1

Ratings of FFA New Horizons by southern region FFA members and advisors

Group	N	Mean	Standard Deviation	Minimum Rating	Maximum Rating
FFA Members	128	7.11	1.97	0	10
FFA Advisors	65	7.25	1.52	3	10

FFA members and advisors would both like to see the number of issues of the FFA New Horizons magazine increased. Over 66% of the FFA members and 50% of the FFA advisors indicated they would like more issues of the FFA New Horizons magazine than they are currently receiving. Table 2 shows the percentage of FFA members and advisors and the number of issues that they would like to receive.

Table 2

Number of issues of the FFA New Horizons magazine preferred.

Number of Issues Preferred	FFA Members		FFA Advisors	
	N	%	N	%
Fewer than 6	3	2.3	3	4.6
Six (same)	40	31.0	29	44.6
Nine	20	15.5	11	16.9
Twelve	66	51.2	22	33.9
TOTAL	129	100.0	65	100.0

Currently, $1.75 of FFA members' dues are designated to support the FFA New Horizons magazine. When asked how much additional dues they would pay to support the magazine, over 88% of FFA members indicated they would pay at least $1.00 more dues. Over 53% of FFA advisors thought members would pay at least $1.00 more dues to support the magazine.

T-tests found that there were significant differences between male and female FFA members on their ratings of FFA New Horizons compared to other magazines. Female FFA members rated the magazine significantly higher than male FFA members. There was also a significant difference between male and female FFA members on the number of issues they would like to receive. Female FFA members would like to receive more issues of the magazine than male FFA members. No significant differences were found when analyzing data from southern region FFA advisors.

Southern region FFA members and advisors were also asked to provide written comments about the FFA New Horizons magazine. A sample of these comments is provided below.

FFA Members

"I really enjoy FFA New Horizons. I love reading it, and sharing it with my friends."

"You really need to cover alot more on the southern states.:."

"Please send us the magazine, in Spanish, because, our language is Spanish..."

FFA Advisors

"Every year, my students seem to lose a little more motivation. I would like to see more articles on chapters which have overcome the same type problem."

"I would like to see a package deal to schools for classroom sets of 35. Since I teach in the middle school I would like to see more career articles..."

CONCLUSIONS

Based on the findings of this survey, seven conclusions were formed:

1. The FFA New Horizons magazine is read extensively by both southern region FFA members and advisors.

2. Southern region FFA members and advisors prefer articles of personal, state, and regional interest and would like to see more articles containing career information in the FFA New Horizons magazine.

3. The most frequently read sections of the FFA New Horizons magazine were the cover story and the joke page.

4. The writing quality, paper quality, and photographs were the highest rated components of the magazine's layout and design.

5. Southern region FFA members and advisors rated the FFA New Horizons magazine a seven on a 10 point scale when compared to other magazines they usually read.

6. Southern region FFA members and advisors would both like to see the number of issues of the FFA New Horizons magazine increased.

7. A large majority of southern region FFA members indicated they would pay more dues to support the FFA New Horizons magazine.

RECOMMENDATIONS

1. FFA New Horizons' staff should work with local FFA members and advisors to develop articles pertaining to local, state, and regional interests. Perhaps a national editorial advisory board could be considered.

2. FFA New Horizons' staff should place greater emphasis on frequently read sections of the magazine such as the cover story and joke page.

3. The editor and writers of the FFA New Horizons magazine should strive to maintain and improve the magazine's high quality layout and design features.

4. FFA New Horizons' staff should initiate the process to increase FFA dues to support more issues of the magazine each year.

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SOUTHERN REGION READERSHIP SURVEY OF THE FFA NEW HORIZONS MAGAZINE

A Critique

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Studies of this type are pragmatic and extremely valuable in the changing environment of today's agricultural education programs. Connors and Krueger commented in their introduction that agriculture subject matter and the clientele who enroll in agriculture classes are not the same as they were a few years ago. Agriculture and auxiliary programs must face the challenges of these changes in order to keep pace with the clientele.

In this study, the researchers completed a good descriptive technique. They utilized focus groups to find out the attributes of current FFA members. The focus groups contributed to the success of the instrument. Random selection of the research sample provided good generalizability to the readership of the magazine. However, it would have been interesting to know how the Southern Region group changed the questionnaire.

Some questions were unanswered in the report. Why were selected statistics not reported? The "Results" section of the paper was written similar to an executive summary with generalizations from the research. As a research report, the readers need to know the exact numbers, percentages, and responses of the sample. For example, what percent of the members and advisors were interested in the photographs and titles when choosing articles to read? How many members and advisors read "FFA in Action" and how often? The researchers gave us their summary statements that respondents "frequently read" these sections; we want to know exactly how frequently.

An interesting question that can be raised from this research concerns the non-readers of the magazine. Who are the FFA members and advisors that do not read the magazine? Why do they not read the magazine? Market research suggests that we should study our current markets rather than an uninterested market. However, in this case, we may have FFA members and advisors who have specific reasons why they do not subscribe to the magazine. Do these non-readers represent one of the non-traditional or new groups studying agriculture? The researchers may find a wealth of information if they choose to investigate this population.

The study completed by Connors and Krueger gives a wealth of insight to the editors of the FFA New Horizons magazine. This type of research can be utilized to enhance the agricultural education profession and successfully serve our clientele.

STUDENT TEACHING EXPERIENCES FOR TEACHING MAJORS IN AGRICULTURAL EDUCATION: A NATIONAL STUDY

by

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STUDENT TEACHING EXPERIENCES FOR TEACHING MAJORS IN AGRICULTURAL EDUCATION: A NATIONAL STUDY

INTRODUCTION AND THEORETICAL FRAME WORK

Experience-based learning to bridge the gap between work or actual practice and study has long been a goal in the preparation of professionals in all fields (Byrne and Wolfe, 1976). The history of field experiences in education started with the advent of academic preparation for education in normal schools in the 1830's and has continued to change and develop as teacher education programs have evolved to their present state. (Sinclair, 1975) The culminating field experience of student teaching, in some form, is the one element that is common to teacher education programs.

Field experiences are mandated in National Council for Accreditation of Teacher Education standards by which teacher education programs are accredited. Standard II.A: Clinical and Field-Based Experiences says, "The unit makes certain that clinical and field-based experiences in the professional education curriculum are designed to prepare students to work effectively in specific education roles". (NCATE, 1990 p. 49) NCATE also mandates that the student teaching experience be a full-day for at least 10 weeks. How these experiences are structured and how they are conducted are the prerogative of each institution. According to Burstein (1988) "To maximize the student teaching experience, universities need to determine what activities are important in preparing a student teacher, providing opportunities for such activities and monitor the activities to ensure quality student teacher training" (p. 16).

A recent national study by Larke, Norris and Briers (1992) examined the perceptions of teacher educators, cooperating teachers and student teachers concerning the student teaching experience in agricultural education. They asked these three groups their perceptions of how the experience should be structured, what should be the ideal roles of the parties involved and what requirements should be met by cooperating teachers and schools.

The teacher educators perception of how long the student teaching experience should be as reported by Larke et al (1992), was 10.6 weeks. The study indicated that teacher educators "strongly agreed" (4.63 on a 5-point scale) that "Student teaching centers should allow faculty members to make final student teacher placement decisions." The study also reported that teacher educators were "neutral" (3.17) on allowing "student teachers to select teaching center." The perception study indicated that teacher educators "agreed" (3.76) that student teachers should be required to live in the community.

The Larke et al. (1992) study indicated that teacher educators "agreed" (4.14 on a 5-point scale) that cooperating teachers should have a masters degree. The study indicated the perceived ideal length of teaching experience prior to serving as a cooperating teacher was 4.86 years and 3.6 years teaching in their current school. Teacher educators "strongly agreed" that cooperating teachers should "be required to attend a special course or workshop" and that they should "display continual professional growth" (means of 4.51 and 4.62 respectively). The study also indicated that teacher educators "agreed", mean = 3.79, that cooperating schools should "have and active adult/young farmer program.

The study presented teacher educators perceptions of the ideal, but how is that reflected in actual practice? What do departments actually require student teachers to do? What is the duration of the experience? What requirements are cooperating teachers actually required to meet?

No recent studies reflect current practice in the agricultural education profession. Deeds, Arrington and Flowers (1988) as a result of their study of cooperating teacher attitudes about student teaching in three states, recommend further study to determine if expectations concerning student teaching were changing as a result of educational reform programs nationwide. The report of the AAAE Ad Hoc Work Group on Developing Curriculum Options in Agricultural Education noted that the role of agricultural education departments has changed in the last 10 years including a broadening of the role with less emphasis on teacher education (Herring, 1992). Have those changes affected the student teaching experience?

PURPOSES AND OBJECTIVES

The purpose of this study was to determine the scope and nature of field experiences required of students in pre-service teacher education programs. The specific objectives for the study were as follows:

1. To determine the scope of the student teaching experiences.
2. To determine what assignments or activities were required for a grade during student teaching.
3. To determine the nature of the student teaching placements including site selection and credit earned.
4. To determine the type and scope of supervision during the student teaching experiences.

METHODOLOGY

Data for the study were collected using a researcher developed instrument in the Fall of 1992. Content validity of the instrument was determined by a panel of experts made up of agricultural education faculty and graduate students. The frame for the study was all 97 institutions listed in the AAAE Directory for 1992. The instruments were mailed with a cover letter and stamped return envelope to department heads of agricultural education departments listed in the directory. Non-respondents were sent a follow up postcard after the September 18 return date. A second mailing of the instrument was completed in early October. All non-respondents were contacted by phone and asked to complete the instrument. Five institutions indicated that they no longer had agricultural teacher education programs at their institution, making the final population 92 institutions.

The total response rate was 89 percent with 82 of the 92 institutions responding. The instrument consisted of 39 forced choice questions concerning field experience requirements and expectations, as well as demographic information concerning the institutions. The nature of the instrument made the determination of a reliability coefficient inappropriate. Data were analyzed using SPSSpc.

FINDINGS

The responding institutions represented all of the AAAE regions. Southern region had the most respondents with 36 (43.4%) followed by central with 19 (22.9%), and western and eastern regions each with 14 (16.9%) responding institutions. A majority of the respondents (58 or 69.9%) indicated they were located in a college of agriculture. The next most common location was the college of education with 15 (18.1%) followed by joint appointments in five (6.0%) institutions and five reporting their location as other than those listed.

The responding institutions indicated an average of 2.4 faculty supervising field experiences with a range of 1 to 10. A majority of the institutions had 1 or 2 faculty members supervising. (Table 1)

Table 1
Number of Faculty Members Involved in Field Experience Supervision

Number of Faculty Members	Frequency	Percentage
1 - 2	51	61.4
3 - 4	23	27.8
5 - 6	7	8.4
7 - 8	1	1.2
9 - 10	1	1.2
Total	83	100.0

Graduate students were not used to supervise field experiences in 68 (82.9%) of the responding institutions. Six (7.3%) institutions used one graduate student supervisor, four (4.9%) used two, three (3.7%) used three and one institution used four.

Over 75% of the responding institutions had less than 50 teaching agriculture education majors in their department. The number of students enrolled in a teaching agricultural education degree ranged from 1 to 145 students. The mean number was 36.5. Table 2 indicates that two schools reported 100 or more students in the teaching degree option.

Table 2

Number of Teaching Option Agricultural Education Majors

Number of Majors	Institutions	Percentage
1 - 25	33	40.7
26 - 50	31	38.3
51 - 75	10	12.4
76 - 100	5	6.2
101 - 125	1	1.2
126 - 150	1	1.2
Total	30	100.0

The duration of student teaching has a bimodal distribution with 10 weeks, reported by 27 institutions, and 12 weeks reported by 22, being the most common. The range was 7 to 18 weeks with a mean of 11.9 weeks required. Credit awarded on a semester credit basis varied from 5 to 15 with a mean of 9.7. The number of weeks of student teaching had increased in the last ten years in 43 (52.4%) of the responding institutions with 4 (4.9%) indicating a decrease. The number of weeks required is specified by state certification requirements at 38 (46.3%) institutions, by the ag ed faculty at 14 (17.1%) and by the College of Education at 19 (23.2%) institutions. Eleven institutions used a different method or a combination of those above.

The most common means of assignment to student teaching sites was by student selection from an approved list, 37 (44.6%) institutions, followed closely by faculty assignment at 32 (38.6%) institutions, with students free to select the site in 2 (2.4%) institutions. A combination of the above methods was used in 12 (14.5%) of the institutions. The Students were not allowed to return to their home high school to student teach in 76 of the 83 institutions. Some respondents indicated it was occasionally allowed with an older student or if it was allowed it was strongly discouraged. Fourteen (16.9%) of the responding institutions required the student teachers to live in the school district where they would be student teaching. Of the 69 (83.1%) that did not require students to live in the district, the average number of miles students were allowed to commute ranged from 10 to 60 with a mean of 35 miles.

Table 3 indicates the most reported assignments or activities required for a grade in student teaching. Five assignments or activities were required by over 90% of the responding institutions including "observe agriculture teaching", "develop teaching plans", "participate in FFA activities", "participate in the preparation of FFA contest teams", and "attend agriculture teacher professional meetings". "Keep financial records (travel, supplies, etc.)" was the least often required assignment (43.4%). Other student teaching assignments mentioned several times included: participation with adult education, completing a community survey, meeting with the advisory committee, completing a bulletin board and completing SAE or special needs student profiles.

Table 3
Student Teaching Assignments/Activities Required For Grade

Assignment/Activities	Number	Percentage
Observe Agriculture Teaching	82	98.8
Develop Teaching Plans	81	97.6
Participate in FFA Activities	80	96.4
FFA Contest Preparation	75	90.4
Attend Agriculture Teacher Meetings	75	90.4
Complete SAE Supervision	74	89.2
Diary of Experiences	74	89.2
Meet with School Administrators	73	88.0
Attend School in-service	72	86.7
Participate in SAE Planning	71	85.5
Use University Specified Methods	70	84.3
FFA Public Relations	67	80.7
Participate in Community Activities	64	77.1
Completion of FFA Award Applications	63	75.9
School Activities Other Than Ag	59	71.1
Observe Teaching in Other Disciplines	58	79.9
Keep Financial Records	36	43.4

Cooperating teachers were required to meet specific requirements at 77 (92.8%) of the responding institutions. A masters degree was required by 33 (52%) institutions with a bachelors degree required by 31 (48%). A minimum of 3 years of teaching experience was required by 45 (62.5%) of the departments with a mean of 3.6 years. Teachers were required to have taught in their current school a mean of 2.5 years.

Special training for cooperating teachers in student teacher supervision was required by 51 (66.2%) of the respondents and 44 (57.1%) required that they be a member of their professional organization. In addition 10 institutions required that teachers have an adult/young farmer program and 9 required an active FFA Alumni chapter. Other cooperating teacher requirements that were mentioned several times by respondents included: active in FFA contests, have a well balanced program, be approved by the state department of education, have adequate facilities and equipment and if they don't already have a masters degree be working on one.

Cooperating teachers were required to complete written evaluation of student teachers. A range from one at the end of the experience to one every day of student teaching. The mean number of written evaluations by the cooperating teacher was 5 with a mode of 2.

University supervisors made an average of 3.7 supervisory visits per student teacher. The range in the number of visits was 2 to 9 with a mode of 3. Fifteen departments (18.3%) permitted graduate students to supervise student teachers; 11 allowed doctoral degree students to supervise and 6 permitted masters students. Several respondents indicated that graduate students were encouraged or permitted to accompany faculty on supervisory visits.

CONCLUSIONS AND RECOMMENDATIONS

The number of weeks required for student teaching has increased in a majority of the agricultural education departments in the last 10 years. The mean number of weeks required (11.9) exceeds the perceived ideal reported (10.6) by more than a week. This may be reflective of the fact that in most states the number of weeks required is determined by state certification agencies or colleges of education in nearly 70% of the institutions reporting.

The data indicated that in most states student teaching placement in a combination of student desires and faculty control. Faculty have control in that students are allowed to select from an approved list developed by the faculty or the final placement is made by the faculty. This supports the perceived desire of the faculty to make the placement. Students are not allowed to return to their home high school to teach, however, they are also not required to live in the community where the student teaching experience is being completed. Most departments discourage student teachers from commuting more than 35 miles to student teach.

Common student teaching assignments or activities covered all areas of a well rounded agricultural education program including planning for instruction, participation in FFA activities, supervised agricultural experience program supervision and planning, and participation in school and community activities. Keeping financial records and observing teaching in other disciplines were the least common student teaching assignments. Several respondents returned copies of their student teaching assignments with their instrument which provided additional information of interest to the researcher. One area of concern was keeping financial records. Teachers, especially new teachers, often complain about the paperwork required and not being prepared to deal with the record keeping. Departments may want to consider adding record keeping and/or forms to their requirements.

Only five of the responding departments did not require cooperating teachers and schools to meet some specific requirements. An advanced degree was preferred by a majority of the departments and a minimum of three years teaching experience. Teacher educators perceived that cooperating teachers needed special training in the Larke et al (1992) and followed up that belief by requiring special cooperating teacher training in two-thirds of the institutions. Teacher educators agreed with the perception that cooperating teachers should have adult/young farmer programs; however, only nine institutions had an adult program as a site requirement.

Departments should consider having more specific and stringent requirements for cooperating teachers and sites. The research on field experiences indicates that student teachers often emulate the cooperating teacher. If cooperating teachers are not required to be members of their professional organization or to have adult programs, student teachers may receive the wrong message.

All departments required cooperating teachers to do written evaluations of the student teachers performance. In several departments, only one at the end of the experience was required while other departments required something written every day. The mean number of written evaluations divided into the mean number of weeks of student teaching would indicate a written evaluation about once every two weeks of the experience. The question for further research would be: what other kinds of feedback are cooperating teachers providing to the student teachers if written evaluations are not required?

Graduate students were permitted to supervise student teachers in less than one-fifth of the agricultural education departments nationwide; those that did use graduate student supervisors were more likely to use doctoral students. Comments on the instrument indicated that graduate students were encouraged to make supervisory visits with faculty members who visited students three to four times during the experience. Because most teacher educators in agriculture are involved in student teacher supervision, departments may want to consider requiring graduate students to participate in supervision. Student teachers are required to make a specified number of SAEP visits to prepare them for teaching. Perhaps, graduate students should be required to accompany faculty on a specified number of supervisory visits.

Recommendations for further study on the subject include:

1. Determine more specifically the assignments required for student teaching by collecting copies of actual student teaching assignments to determine more specifically what the assignments are, how many times students are expected to complete some activities and to what level (eg. are they to observe or actually perform a specific activity). This information would be helpful in modifying current experiences, especially in those departments that are being called on to expand, or in some cases, reduce the length of the student teaching experience.
2. Determine what types of feedback are provided to student teachers by cooperating teachers and university supervisors. Determining what type of forms, if any, are used for student teacher evaluation. This information could be useful in modifying current forms used or in developing forms to better serve students needs for feedback.
3. Although all departments responding indicated that they supervised student teachers on-site, it is not clear what activities are conducted during the supervisors on-site visits. Additional research into what is done and what activities seem to be most effective could prove helpful to new professionals in agricultural education supervising student teachers for the first time.

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STUDENT TEACHING EXPERIENCES FOR TEACHING MAJORS IN AGRICULTURAL EDUCATION: A NATIONAL STUDY

A Critique

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This study was designed to determine the extent to which the practice of student teaching met the ideals of student teaching as determined by three authors named Larke, Norris, and Briers. Perhaps it was by design that I was chosen to discuss this paper. At least I can compliment the author on her literature review! It is appropriate that this research builds on previously conducted research on student teaching. And, while the expressed purpose of this research was to describe the current status of student teaching experiences, an actual outcome was a comparison of the actual versus ideal of student teaching practice.

The design of this study was status descriptive. No attempt was made to explain, predict, relate, or compare. While some would complain that the researcher did not go far enough in conducting research, it is commendable that she did not overstep her bounds by claiming more than could be concluded. As is the case with purely status descriptive studies, this effort asks more questions than it answers. The researcher points this out when she recommended areas for further study.

Procedures for survey research seemed to be followed well. The researcher attempted to conduct a census of programs of teacher education in agriculture. Eighty-nine percent of the population responded to the data collection instrument. Several attempts were made to collect data from all subjects. The list of student teaching assignments/required activities should be most helpful to those of us who work in teacher education. As the author suggests, this list might be most valuable as a guide for developing specific requirements. Personally, I shall compare our own student teaching activities with the list provided to ensure that we require the popular ones (as well as those we simply "know" are good because of our own experience).

I do wonder, however, if we in agricultural education look closely enough at other teacher education research in designing our programs. On the other hand, my personal experience has been that we in agricultural education are "in front of the pack" with most of our procedures for student teaching activities. I urge this researcher and others to keep searching for answers to ensure that we stay ahead.

A THREE YEAR STUDY OF STUDENT ACHIEVEMENT AND FACTORS RELATED TO ACHIEVEMENT IN A STATE FFA AGRICULTURAL MECHANICS CONTEST

by

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INTRODUCTION AND THEORETICAL FRAMEWORK

Agricultural educators profess that a total secondary agricultural education program consists of three essential and interdependent components. These components are classroom and laboratory instruction, supervised agricultural experience, and the FFA (Newcomb, McCracken and Warmbrod, 1986; Phipps and Osborne, 1988).

Contests are an integral part of the FFA at the local, state, and national levels (Binkley and Byers, 1982). According to the National FFA Organization (1991), "FFA contests make classroom instruction come alive as students use their skills in competitive settings. Contests help develop technical knowledge, judgement, reasoning, and sportsmanship" (p. 50).

Smith and Kahler (1987) estimated that approximately 87,000 students participate in state and local FFA contests each year. According to Smith and Kahler (1987), these contests "...have a broad impact on the educational experience of some 468,953 students enrolled in vocational agriculture and participating in the FFA organization" (p. 45).

FFA contests are intended to be educational experiences for the participants (Binkley and Byers, 1982). According to Smith and Kahler (1987), "In order for the national FFA contests to provide truly educational experiences, these contest must be continuously evaluated and revised" (p.45). This statement is just as valid for FFA contests conducted at the chapter, district, and state levels.

Buriak, Harper, and Gliem (1985) performed an internal evaluation of the National FFA Agricultural Mechanics contest using contest scores and selected contestant demographic variables. According to Buriak et al. (1985)

> This investigation demonstrates the utility of contest score evaluation and the need for further evaluation. Investigations of the prediction value of selected variables could prove useful in the development and enhancement of the contests. The use of trend analysis could explore the progress of contestants' scores in the various areas of a contest and may indicate areas needing particular attention. (p.32)

Previous research (Brozozowski, 1988; Chapman, 1988; and Johnson, 1991) has indicated that several student characteristics are associated with achievement in agricultural mechanics. These characteristics include: gender, number of mathematics courses completed, average grade in mathematics courses, average grade in agriculture courses, and farm work experience.

Johnson (1991) examined factors related to achievement in the 1990 Mississippi State FFA Agricultural Mechanics Contest. Using descriptors established by (Davis, 1971), low to moderate positive relationships were found between the students' total contest scores and the variables of age, grade level, average grade in agriculture courses, years of mathematics completed, average grade in mathematics courses, and farm work experience.

The results of Johnson's (1991) study were limited by the small population (N=27) size and by the fact that data were collected for only the 1990 contest.

The present study incorporates data from two additional contest years (1991 and 1992) in an attempt to provide more in-depth information on student achievement and factors related to achievement in a state FFA agricultural mechanics contest. The findings of this study should provide further information with which to evaluate and improve the state FFA agricultural mechanics contest.

PURPOSE AND OBJECTIVES

The purpose of this study was to examine student achievement and factors related to achievement in the 1990-1992 Mississippi State FFA Agricultural Mechanics Contests. Specific objectives were to:

1. describe students participating in the 1990-1992 state FFA agricultural mechanics contests on the variables of: (a) age, (b) gender, (c) grade level, (d) number of years of agricultural education completed, (e) average grade in agriculture classes, (f) number of years of mathematics completed, (g) average grade in mathematics courses,(h) farm work experience, (i) previous contest experience, and (j) use of a calculator during the contest;
2. describe student achievement in the 1990-1992 state FFA agricultural mechanics contests as indicated by contest scores;
3. determine the relationship between student achievement in the 1990-1992 state FFA agricultural mechanics contests and selected student demographic variables; and
4. determine if a linear combination of student demographic variables could explain a significant portion of the variance associated with achievement in the 1990-1992 state FFA agricultural mechanics contests.

PROCEDURES

This study employed a descriptive-correlational design. The population was composed of all students competing in the 1990-1992 Mississippi State FFA Agricultural Mechanics Contests (N=73). Contest score data were obtained for all 73 participants; demographic information was available for 68 (93%) of the contest participants.

The Mississippi State FFA Agricultural Mechanics Contest is divided into the following subject matter areas: (a) agricultural structures and electrification, (b) agricultural power and machinery, and (c) agricultural construction and soil and water conservation. During the contest each participant completes two skill activities and one problem solving activity in each of the three contest areas. In addition, each contestant completes a 30-item multiple choice examination which includes 10 items from each of the three subject matter areas.

The Mississippi state agricultural mechanics contest is an open-entry contest; any team can compete in the state contest without participating or placing in the district contest. The Mississippi state contest follows the same format and rotation schedule as the National FFA Agricultural Mechanics Contest. All state contest activities and test items were developed based on the validated list of competencies suggested for the national contest (National FFA Organization, 1990).

In order to meet the research objectives, student scores were analyzed in the following contest areas: (a) agricultural structures and electrification skills, (b) agricultural power and machinery skills, (c) agricultural construction and soil and water conservation skills, (d) problem solving activities, (e) written examination and (f) total contest score. A maximum score of 30 points was possible in each of the five contest areas (a-e); therefore, 150 points was the maximum total contest score (5 areas at 30 points each).

Information about student demographic characteristics was collected using a researcher designed instrument. The eight-item instrument used in 1990 (Johnson, 1991) had been developed based on a review of research concerning characteristics related to achievement in agricultural mechanics (Brozozowski, 1988; Chapman, 1988). Based on informal observations and discussions with coaches and contestants following the 1990 contest, two additional items (previous district or state agricultural mechanics contest participation and use of a calculator during the contest) were added to the instrument for the 1991 and 1992 contest years.

Data for objectives one and two were analyzed using descriptive statistics. Bivariate correlation coefficients were used to analyze data for objective three. Stepwise multiple regression was used to analyze data for objective four. The .10 alpha level was selected *a priori* for exploratory regression analysis.

RESULTS

The typical contestant in the 1990-1992 Mississippi State FFA Agricultural Mechanics Contests was male (100%), approximately 17 years of age, and, by a narrow margin, did not live or work on a farm (53.5%). Slightly fewer than one-half of the participants in the 1991 and 1992 contests had either used a calculator during the contest (41.9%) or competed in a previous district or state FFA agricultural mechanics contest (46.5%). Table 1 presents descriptive statistics for the contestant demographic characteristics of interest in this study.

Table 1.
Summary of Selected Contestant Demographic Characteristics, 1990-1992.

	Year			
Contestant Characteristic	1990 X SD	1991 X SD	1992 X SD	Combined X SD
Age	16.88	17.10	16.83	16.93
	1.24	1.29	1.37	1.29
Grade	11.32	10.95	10.83	11.04
	.75	.82	.94	.85
Years of Agriculture	2.84	2.74	2.44	2.67
	.94	1.09	1.08	1.04
Average Grade in Agriculture	3.68	3.56	3.55	3.60
	.48	.62	.61	.56
Years of Mathematics	2.88	2.30	2.47	2.57
	.78	.57	.95	.82
Average Grade in Mathematics	2.50	2.74	2.25	2.49
	.86	.87	.91	.89

Overall, students tended to score highest in the agricultural power and machinery skills area (15.07/30; 50.2%), and lowest in the problem solving area (7.04/30; 23.5%). However, there was variation between contest years, with students scoring highest on the written examination in 1991 and on the agricultural construction and soil and water conservation skills area in 1992. Conversely, students scored lowest on the agricultural construction and soil and water conservation skills area in 1991. Total contest scores ranged from 47.32 (31.5%) in 1991 to 72.50 (48.3%) in 1992. The mean total contest score for the three year period was 59.15 (39.4%). Table two summarizes student achievement in the 1990-1992 contests by year, contest area, and overall.

Using descriptors suggested by Davis (1971), the relationships between total contest score and the student characteristics of age, grade level, years of agricultural education completed, and average grade in mathematics courses were negligible. Average grade in agriculture and farm work experience had low, positive relationships with total contest score. Moderate, positive relationships existed between total contest score and years of mathematics completed, previous contest experience, and use of a calculator. Table 3 presents the correlation coefficient and the coefficient of determination for the relationship between total contest score and each of the demographic characteristics investigated.

Table 2.
Student Achievement In The Mississippi State FFA Agricultural Mechanics Contest, 1990-1992.

Contest Area	Year 1990(n=27) X	 SD	 1991(n=22) X	 SD	 1992(n=24) X	 SD	 Overall(N=73) X	 SD
Agricultural Structures and Electrification Skills (30 pts.)	14.22	5.34	9.91	6.32	9.54	6.01	11.38	6.19
Agricultural Power and Machinery Skills (30 pts.)	14.70	5.36	10.23	3.61	19.92	5.11	15.07	6.13
Agricultural Construction and Soil & Water Skills (30 pts.)	9.19	4.65	6.05	5.49	22.75	5.84	12.70	8.91
Problem Solving Activities (30 pts.)	5.63	3.53	9.45	4.75	6.42	4.05	7.04	4.36
Written Examination (30 pts.)	13.19	3.00	11.73	2.57	13.92	3.32	12.99	3.08
Total Contest Score (150 pts.)	56.93	13.66	47.32	17.25	72.50	14.77	59.15	18.11

Table 3.
Relationship Between Contestant Demographic Characteristics And Total Contest Score.

Characteristic	Total Contest Score	
	r	r^2
Age	-.06	.00
Grade Level	.08	.01
Years of Agricultural Education Completed	.00	.00
Average Grade in Agriculture Courses	.14*	.02
Years of Mathematics Completed	.32**	.10
Average Grade in Mathematics Courses	.06	.00
Farm Work Experience	.21*	.04
Previous Contest Experience	.34**	.12
Use of Calculator	.47**	.22

Note. * = low relationship; ** = moderate relationship (Davis, 1971).

In order for a variable to serve as a good predictor in a regression model, the variable should possess two characteristics: a high correlation with the variable to be predicted and little or no correlation with other potential predictor variables (Pedhazur, 1982). After examination of the intercorrelations between all variables, three variables were selected which most closely met these requirements: farm work experience, years of mathematics completed, and use of a calculator during the contest.

Table 4 presents the results of the stepwise regression procedure. Two variables, use of a calculator during the contest and years of mathematics completed, entered into the regression model. Together, these two variables were capable of explaining approximately 35% of the variance in total contest scores for the 1991 and 1992 contests. (Note: since information on use of a calculator was not collected for 1990 contest participants, the 1990 contest group was excluded from the regression analysis).

Table 4.
Stepwise Regression Of Total Contest Score On Selected Student Characteristics.

Characteristic	Partial R^2	Model R^2	F	p
Use of a Calculator	.224	.224	11.83	.001
Years of Mathematics	.130	.354	8.02	.007

Note. df = 1,41

CONCLUSIONS AND RECOMMENDATIONS

The overall level of student achievement in the state FFA agricultural mechanics contest was low. However, interpretation of this finding must be tempered with the realization that contests represent a rather unique form of student evaluation. Since contests are intended to discriminate among individuals, contest activities must include items that represent a wide range of difficulty. Therefore, by definition and design, some contest activities will be too difficult for almost every contestant to complete with 100% accuracy. However, the results of this study indicate that future contest planners should attempt to develop activities which are more within the capabilities of contest participants. Such activities should be challenging and discriminate among contestants while still providing participants with the opportunity to achieve higher contest scores.

Average grade in agriculture courses, years of mathematics completed, and farm work experience were all positively related to achievement the agricultural mechanics contest. These three variables were also found to be related to achievement in the 1990 contest study (Johnson, 1991).

Additionally, this study found that both use of a calculator during the contest and previous contest experience were positively related to contest achievement. Although this does not prove a causal relationship, agriculture teachers should be encouraged to enter their agricultural mechanics teams in the district contest and to ensure that each participant brings a calculator for use during the contest.

Age and number of years of agricultural education completed were not related to contest achievement. This is consistent with previous research (Brozozowski, 1988; Chapman, 1988) and with Johnson's study of the 1990 contest (Johnson, 1991). The lack of a relationship between achievement and number of years of agricultural education completed should be examined further. Future efforts should seek to determine the relationship between the quality and quantity of agricultural mechanics instruction provided at the local level and student achievement in the state FFA agricultural mechanics contest.

Use of a calculator during the contest and years of mathematics courses completed combined to explain approximately 35% of the variance in contest achievement. This underscores the importance of mathematics to achievement in agricultural mechanics. This finding is supported by Gliem and Warmbrod(1986).

The results of this study will be used to improve future Mississippi State FFA Agricultural Mechanics Contests. In addition, the results have substantiated previous research concerning student characteristics which are (and are not) related to achievement in agricultural mechanics. Future studies should seek to expand on this base in an effort to both enhance knowledge and improve practice.

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A THREE YEAR STUDY OF STUDENT ACHIEVEMENT AND FACTORS RELATED TO ACHIEVEMENT IN A STATE FFA AGRICULTURAL MECHANICS CONTEST

A Critique

Glen C. Shinn, Clemson University--Discussant

The researcher selected a significant problem; to attempt to better understand student achievement and to identify factors which relate to achievement are commendable goals. The literature which explains effects of student achievement associated with contests is scarce. As teachers, we believe contests are a tool which enhances achievement. As a researchers, we do not have evidence of a relationship. Dr. Johnson is to be commended for a time-series study using a descriptive-correlational design to examine achievement. The paper is well organized and written.

A separate section on research methods with a delineation between the procedures and results would have been beneficial. The procedures were appropriate for the purpose and objectives of the research. The grade scale was not clear (4.0-A). It was not clear if the grades were self-reported or collected by other means.

The results used both descriptive and quantitative techniques for reporting. The tables were well organized and presented. The discussion regarding the variation of scores between contest years was of limited value since the scores were not adjusted for varying levels of difficulty among the three contest years. The explanation of 35% of the variance was a very beneficial result and consistent with Gliem & Warmbrod.

The conclusion regarding contest difficulty extends directly from the findings. Other conclusions were somewhat ambiguous but focused on the significance of agricultural course grades, mathematics experience and farm work experience. The researcher recognized the limitations of the calculator; just bringing a calculator would likely not enhance achievement. Achievement was improved when the use of the calculator was coupled with years of mathematics courses.

The recommendations presented were limited and imbedded within the report. Perhaps the recommendations should be more direct. Can you recommend that: 1) agricultural mechanics contest difficulty should be more appropriate to the abilities and experience of the student? 2) students should be encouraged to develop more competence in using the calculator? 3) students should be encouraged to enroll in more mathematics courses? and 4) research should explain the weak relationship between years of agricultural education courses and achievement (knowledge and skills) in agricultural mechanics?

The goals to understand student achievement and to identify factors which are related to achievement are worthy research goals and warrants more investigation.

TRAINING NEEDS OF AREA SPECIALIZED EXTENSION AGENTS IN THE NORTH CAROLINA COOPERATIVE EXTENSION SERVICE

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TRAINING NEEDS OF AREA SPECIALIZED EXTENSION AGENTS IN THE NORTH CAROLINA COOPERATIVE EXTENSION SERVICE

INTRODUCTION AND THEORETICAL FRAMEWORK

The Cooperative Extension Service (CES) is a nonformal educational organization whose purpose is to transfer practical, research-based knowledge from land-grant colleges to citizens who can use that knowledge to improve their quality of life. Helping people bring about change and adapt to change are major strengths of the organization. The Extension Service itself is undergoing change as it addresses complex social issues and attempts to reach new audiences. To meet these challenges, the Extension Service has supplemented its staff of nonspecialized county agents with specialized area agents who have more in-depth knowledge of specific subject areas.

The Emergence of the Area Specialized Extension Agents

Since the passage of the Smith-Lever Act of 1914, extension agents have been nonspecialists--that is, they have had to be knowledgeable about all aspects of agriculture. Today agriculture, along with all other areas of society, is developing so quickly and becoming so specialized that extension agents with responsibility for broad subject areas cannot keep up with the technology. To address the problem, the North Carolina Cooperative Extension Service (NCCES) has added area specialized extension agents (ASEAs) to its field staff. These agents cover a territory consisting of several counties and specialize in a single subject area.

Currently, North Carolina has 66 ASEAs working in 18 different subject areas. Although the number of specialized positions is growing in all subject areas, the majority of these positions are in farm management.

This change in staffing is proving to be very effective in working with clientele throughout the state. The ASEA concept allows the agent to concentrate on one area in which he or she can become highly proficient. Specialization benefits the client and reduces job frustration for agents previously responsible for an entire county and multiple subject areas. The new challenge for the CES is to develop training programs suitable for ASEAs because virtually all existing training programs are intended for nonspecialists.

The North Carolina Cooperative Extension Service is currently making program and staffing changes to meet the challenges of its organizational goals. With the development of the ASEA position, it became necessary to evaluate which ASEAs need training, determine the specific subjects in which they need and desire training, and establish the training priorities of extension administrators. It was also necessary to evaluate the needs of ASEAs for preservice, induction, in-service, and graduate training.

PURPOSES AND OBJECTIVES

This study was designed to determine which of the competency areas the ASEAs, administrators, and subject-matter specialists of the North Carolina Cooperative Extension Service consider most important and in which of these areas they perceive a need for training programs. A secondary purpose was to determine the level of agreement between the opinions of the ASEAs and those of subject-matter specialists and administrators (i.e., district directors and county directors where the ASEAs work) about the importance of the various competency areas to the effectiveness of the agents. The study also determined the topics within the competency areas that ASEAs would like to have included in programs of in-service training. In addition, data on selected demographic characteristics were collected in this study. Those data were analyzed and used for descriptive purposes.

The specific objectives of the study were to:

1. Determine the importance of and the need for training in each of the eight competency areas as expressed by ASEAs, subject-matter specialists, and administrators.
2. Determine the differences in importance of and need for training in each of the eight competency areas as expressed by ASEAs, subject-matter specialists, and administrators.
3. Determine the importance of and the need for training for the specific items in each of the eight competency areas as expressed by ASEAs, subject-matter specialists, and administrators.
4. Determine the differences in importance of and the need for training for the specific items in the eight competency areas as expressed by ASEAs, administrators, and subject-matter specialists.
5. Describe selected demographic characteristics of the ASEAs of the NCCES including age, race, gender, level of education, and years of experience with the Extension Service.
6. Develop a training model for ASEAs employed by the NCCES.

METHODS AND PROCEDURES

Population

The population for this study consisted of 66 ASEAs, 49 administrators, and 18 subject-matter specialists employed by the North Carolina Cooperative Extension Service.

Data Collection

During the Fall of 1991 when data were collected 94% or 125 of the 133 potential respondents returned the questionnaire in usable form. By respondent group, the percentages returned were: 91% (n = 60) for ASEAs; 96% (n = 47) for administrators; and 100% (n = 18) for subject-matter specialists.

McCormick (1959) was the foundation for the questionnaire used in this study. Price (1960) adapted it for use in Arkansas. Hubbard (1971) further adapted the questionnaire and utilized it to study the training needs of extension agents of the Clemson Extension Service in South Carolina. Permission was granted to modify the instrument and use it in the present study of ASEAs employed by the North Carolina Cooperative Extension Service.

The questionnaire focused on eight competency areas identified by the Extension Committee on Policy as necessary for the effectiveness of extension agents (National Policy Statement, 1968). Three forms of the same questionnaire were used in the study, one for each group of respondents.

Responses to items in the questionnaire fell into two categories. The first was ratings of the importance of each competency area and specific items in those areas to the effectiveness of ASEAs. Administrators, ASEAs, and subject-matter specialists indicated their opinions of the degree of importance by selecting one of the following ratings: "little or none," "moderately important," "important," or "very important."

The second category of responses dealt with opinions about the need for training of ASEAs in each competency area and specific items in those areas. ASEAs, administrators, and subject-matter specialists indicated the degree to which they believed ASEAs need training in each item by selecting one of the following ratings: "little or none," "moderately important," "need," or "great need."

Reliability of the questionnaire was estimated by field testing the instrument with 16 ASEAs employed by the Virginia Cooperative Extension Service and assessing the results by the split-half method. Reliability for the section pertaining to importance of competencies was .93; reliability of the section pertaining to the need for training was .96.

Data Analysis

The data were analyzed at the Computer Center of North Carolina State University using the Statistical Package for the Social Sciences (SPSS-X). The computer package provided the necessary analytical procedures for calculating descriptive statistics such as means and frequencies.

RESULTS AND/OR FINDINGS

Six research objectives were developed for this study. The results of the analysis of data for each of the six objectives are presented in the following discussion.

Objective 1.

The importance of training and the need for training in each of the eight competency areas were rated by ASEAs, subject-matter specialists, and administrators. Competency areas rated 3.0 or greater were deemed important. Program planning, communication, human development, and educational processes were rated 3.0 or greater by ASEAs. Administrators rated extension organization, program planning, communication, research, human development, educational processes, social systems, and effective thinking 3.0 or greater. Specialists rated program planning, communication, research, human development,and educational processes 3.0 or greater. ASEAs, administrators, and subject-matter specialists all ranked program planning first out of the eight areas of competency.

Objective 2.

Ratings of the importance of and need for training in each of the eight competency areas as expressed by ASEAs, subject-matter specialists, and administrators were compared for differences. For the purposes of this study, a difference of 1.0 or greater was considered an important difference. No important differences were measured. The greatest difference (0.4) was in the extension organization competency area. Likewise, no important differences were measured in ratings of need for training. The greatest difference (0.8) was in the competency area of program planning.

Objective 3.

The importance of and the need for training in specific items within each of the eight areas of competency were rated by ASEAs, subject-matter specialists, and administrators.

Within the extension organization and administration competency area, ASEAs rated philosophy, University/USDA-partner, professional improvement, county responsibilities, area responsibilities, specialists' responsibilities, and promotion procedures 3.0 or greater in importance. Administrators rated history, philosophy, University/USDA-partner, professional improvement, policies, county responsibilities, area responsibilities, district responsibilities, specialists' responsibilities, office management, promotion procedures, and retirement procedures 3.0 or greater in importance. Specialists rated philosophy, professional improvement, county responsibilities, specialists' responsibilities, and promotion procedures 3.0 or greater in importance. ASEAs rated area responsibilities highest. Administrators rated area responsibilities and county responsibilities in a tie for first, whereas specialists rated philosophy and county responsibilities highest.

In terms of need for training in items within the extension organization and administration competency area, ASEAs rated area responsibilities and promotion procedures highest. Administrators rated county responsibilities and area responsibilities highest, and specialists rated professional improvement highest.

In the program planning competency area, ASEAs rated developing programs highest in importance. Administrators rated identifying problems and developing programs highest, whereas specialists rated role of area agents and involving lay people highest in importance. In terms of the need for training in this competency area, ASEAs rated developing programs and evaluation highest. Administrators rated developing programs highest, whereas specialists rated identifying problems highest.

In the communication competency area, ASEAs rated understanding communication and effective newsletters highest in importance. Administrators rated effective visits highest; while specialists rated understanding communication and using computers highest in importance. In terms of need for training in this competency area, ASEAs rated using visual aids and using computers highest. Administrators rated using visual aids, effective newsletters, and using computers highest. Specialists rated using computers highest.

In the research competency area, ASEAs rated evaluating programs and applying research highest in importance. Both administrators and specialists rated applying research and utilizing research highest in importance. In terms of need for training in this competency area, ASEAs rated evaluating programs highest. Administrators rated applying research highest, whereas specialists rated utilizing research highest.

In the human development competency area, ASEAs rated problems of different groups and developing leadership highest in importance. Administrators rated factors with behavior highest; while specialists rated developing leadership highest in importance. In terms of need for training in this competency area, ASEAs rated developing leadership highest. Administrators rated developing leadership and feelings and people highest. Specialists rated developing leadership highest.

In the educational process competency area ASEAs, administrators, and specialists all rated effective teaching highest in importance. ASEAs, administrators, and specialists also all rated effective teaching highest in the need for training.

In the social system competency area, ASEAs rated roles of informal leaders and interaction among agencies highest in importance. Administrators rated identifying leaders and interaction among agencies highest, whereas specialists rated interaction among agencies highest in importance. In terms of need for training in this competency area, ASEAs, administrators, and specialists all rated interaction among agencies highest.

In the effective thinking competency area, ASEAs rated problem solving highest in importance. Administrators rated techniques for effective thinking highest; while specialists rated logical reasoning, problem solving, and techniques for effective thinking highest in importance. In terms of need for training in this competency area, ASEAs, administrators, and specialists all rated techniques for effective thinking highest.

Objective 4.

Differences in ratings of the importance and the need for training among the three respondent groups were determined for the specific items within the eight competency areas. A difference of 1.0 or greater among groups was considered an important difference. The results are reported here by competency area.

There were no important differences in the ratings of the importance for items in the extension organization and administration competency area. There were, however, important differences among groups in ratings of the need for training in history (1.0), philosophy (1.1), University/USDA-partner (1.0), and county responsibilities (1.2).

There were no important differences in the ratings of the importance for the program planning competency area. There was an important difference among groups in ratings of the need for training in program planning (1.0).

There were no important differences in ratings of the importance or the need for training in communication, research, human development, educational process, social systems, and effective thinking.

Objective 5.

Selected demographic characteristics of the ASEAs of the NCCES included age, race, gender, level of education, and years of experience with the extension service. The educational level of ASEAs ranged from bachelor's degrees to doctorates. The majority of agents hold master's degrees; only 5% hold doctorates.

The length of time that ASEAs had held their present positions ranged from 1 to 23 years. The average age of ASEAs employed by the NCCES was 38 years old. Over 50% of the respondents had served in their current position for 5 years of less. Thirty-three percent had served for 3 years or less.

The length of time that the ASEAs had worked in extension ranged from 1 year to 33 years. Over 50% had served for 6 years or less. Seventeen percent had served for 3 years or less. Five percent had served for 33 years.

The majority of ASEAs employed by the NCCES were males. Eighty-two percent (n = 49) of ASEAs were male, 18 % (n = 11) were females. The majority of ASEAs (95%) were Caucasian (n = 57); only 5% (n = 3) were members of minority groups.

Objective 6.

A training model for ASEAs employed by the North Carolina Cooperative Extension Service was developed by examining the training need ratings of the eight competency areas and specific items within each competency area. The criterion used to determine whether a particular content item would be included in the model was receiving a mean score of at least 2.5 from all three groups on training needs. Of the eight competency areas, only program planning met the criterion. Within the program planning competency area, the specific items that received ratings of at least 2.5 from all three groups were role of area agents, involving lay people, long-term program development, area agent programming, developing programs, and evaluation.

An Area Specialized Extension Agent Development Institute to meet ASEA training needs has been proposed.

CONCLUSIONS AND/OR RECOMMENDATIONS

The conclusions reached are based upon the findings of the study. The conclusions are as follows:

1. Program planning is the only competency area identified from the eight competency areas to be included in training for ASEAs.
2. ASEAs, administrators, and subject-matter specialists agree on the training needs of ASEAs in the eight general competency areas.
3. ASEAs, administrators, and subject-matter specialists agree on the importance of the eight general competency areas.
4. Training should be provided in the following program planning competency area items: role of area agents, involving lay people, long-term program development, area agent programming, developing programs, and evaluation.
5. The three respondent groups' disagree on the need for training for the item history, philosophy, University/USDA-partner, and county responsibilities in the extension organization and administration competency area and for the item program planning in the program planning competency area. The groups agree on the importance of training in the items in the eight competency areas.
6. The typical ASEA employed by NCCES is a 38 year old white male holding a Master's degree with a tenure of slightly more than 5 years.

Recommendations

Based upon the findings of this study and conclusions drawn, the following recommendations are offered:

1. The findings of this study should be made available to the administrative council of the North Carolina Cooperative Extension Service.
2. The staff development personnel should implement the proposed area specialized extension agent development institute.
3. The findings of this study should be made available to ASEAs, county directors, and district directors employed by the NCCES.
4. Research should be conducted in other states with ASEAs utilizing the instrument revised for this study to determine their training needs and the level of agreement between administrators, subject-matter specialists, and ASEAs.

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TRAINING NEEDS OF AREA SPECIALIZED EXTENSION AGENTS IN THE NORTH CAROLINA COOPERATIVE EXTENSION SERVICE

A Critique

Carey L. Ford, Tennessee State University - - Discussant

The researchers are to be commended for presenting an excellent manuscript of research, which reflects the training needs of cooperative extension agents. Clients of the Cooperative Extension Service are facing many complex problems due to a more competitive global agricultural industry and innovative ideas. Training the area specialized extension agents is an important step toward the transfer of technologies.

The authors developed a sound theoretical framework for training needs of the area specialized agents. The objectives of the study were clearly stated and the research procedures used to gather the data were sound. The results were clearly written; however, tables would have been easier to compare the findings. Conclusions and recommendations were supported by the results of the study. Again, I commend the authors for addressing a very important issue in a professional manner.

In reviewing the paper, the following questions or comments were proposed to the authors for consideration:

1. Was the revised instrument tested for validity?
2. It appears that the population in this study had three groups. Were the administrators and subject-matter specialists identified as area specialized extension agents?
3. The study could be strengthened by introducing in your review of literature and throughout the paper, related research regarding training specialized personnel in carrying out educational outreach programs.

WHO'S IN CHARGE HERE?
AN ANALYSIS OF THE LEADERSHIP IN AGRICULTURAL EDUCATION PROVIDED BY THE FEDERAL BOARD FOR VOCATIONAL EDUCATION

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Who's In Charge Here?

An Analysis of the Leadership in Agricultural Education Provided by The Federal Board for Vocational Education

Introduction and Theoretical Framework

An important contemporary issue in agricultural education is what Federal leadership should be provided to the field. Should it originate from the United States Department of Education or from the United States Department of Agriculture? How important a role should Federal leadership play when most agree that the primary responsibility for public education rests with the states?

With instruction in agricultural education existing before 1917, some precedents had to be made even before passage of the Smith-Hughes Act. Federal leadership for agricultural education during that period of time was provided by the United States Department of Agriculture. However, with passage of Smith-Hughes a great deal of new activity for the administration of agricultural education started to occur. Precedents had to be set on interpretations of the Act on what was a reimbursable expense, interpretations had to be made on the definition of agricultural education as well as vocational education, and a great deal of communication had to occur to make the public aware of this newly funded program at the Federal level.

Purpose and Objectives

The purpose of the study was to determine the influence of the Federal Board for Vocational Education (Board) on the early development of Federally funded agricultural education. The specific objectives accomplished were:

1. To determine why the Board was established.
2. To determine who were staff and governing board members of the Board and what role they played.
3. To determine and examine important decisions and contributions of the Board.
4. To determine what caused the demise of the Board.
5. To draw implications for contemporary agricultural educators from the precedents set by the Board.

Methods and Procedures

Historical research methods were utilized to accomplish the objectives of the study. Both primary and secondary sources were used to obtain the information needed. Primary sources included publications of the Board, books, and Congressional publications. Secondary sources included newspaper articles and books. All sources were subjected to internal and external criticism. Information was obtained from the Library of Congress, the National Agriculture Library, the United States Department of Education Library, and the library of the American Vocational Association.

Results and/or Findings

Why a Federal Board?

Prior to the establishment of the Federal Board, the United States Department of Agriculture had a unit which had responsibility for agricultural education. In 1911 C. H. Lane was appointed to work with that unit. When the Federal Board was started in 1917 Lane transferred to it.

At the time the Smith-Hughes Act was passed, the Federal government had an agency that was involved in education. This was the Bureau of Education located in the Department of the Interior. A logical question might be why wasn't the regulation and oversight of vocational education assigned to this agency. Why was there a need to create a new Federal agency to oversee vocational education? There are several plausible answers.

The commissioner of Education during this time was P. P. Claxton who showed little understanding of vocational education. In testimony before the Commission on National Aid to Vocational Education he repeatedly referred to school gardens in elementary schools and nature study when describing vocational education. It is obvious from reading his testimony that he had no vision of vocational education (Commission on National Aid to Vocational Education, 1914). Claxton also maintained that the Bureau of Education was woefully understaffed and did not have the money it needed to do a proper job of what it was supposed to be currently doing. Barlow (1967, p. 115) indicated ". . . the attitude of the Commissioner of Education, Philander P. Claxton, contributed toward establishing an independent board . . ." McCarthy's (1950, p. 56) assessment of the situation was more blunt, "Congress . . . had no intention of centering the administrative powers upon one individual and that logical individual would have been the United States Commissioner of Education." It would have been detrimental to turn over this new work to someone with such a limited view of vocational education and who might re-direct the money for vocational education into other priorities within his agency.

There was also concern among the proponents of vocational education that an entirely new scheme was needed. The "old" methods of education were ineffective and a clean start was needed. If existing educational agencies or general educators were involved with vocational education, it might be watered down or sidetracked. This fear was shown in a report of a NEA committee that noted with concern that school administrators tended to deflect vocational "toward general or liberal ends" (Gibson, 1910, p. 720). It was imperative that people who strongly believed in the "correct" type of vocational education be involved in the administration of vocational education.

Personnel of the Board

The final authority for appointing the Board rested with President Wilson. On June 27, 1917 he submitted his nominations for the appointive members of the Board to the Senate. They were approved on July 17. The first meeting of the Federal Board was held on July 21, 1917 in the office of the Secretary of Agriculture (Hawkins, Prosser, & Wright, 1951).

The members of the Board (*The Vocational Summary*, 1918) were:

David F. Houston - Secretary of Agriculture
Charles Greathouse - citizen representing agriculture
William B. Wilson - Secretary of Labor
Philander P. Claxton - Commissioner of Education
Arthur E. Holder - citizen representing labor
William C. Redfield - Secretary of Commerce
James P. Munroe - citizen representing commerce

David F. Houston was elected chairman of the Board. Houston was a native of North Carolina and received his A. B. degree from South Carolina College and his A. M. from Harvard. He taught Ancient Languages at South Carolina College, was Superintendent of Schools in Spartanburg, South Carolina, was on the faculty at Harvard where he served as Dean of the faculty, served as President of Texas A & M College for three years, was President of the University of Texas for the next three years, and then was chancellor of Washington University in St. Louis (Hawkins, Prosser, & Wright, 1951). In 1920 he became the Secretary of the Treasury and left the Federal Board.

Charles A. Greathouse came to the Federal Board as the representative of agriculture from the office of state superintendent of public instruction in Indiana where he had served three terms (Hawkins, Prosser, & Wright, 1951). He had received his education from a small normal school and Indiana University. He was on the board of trustees for the Indiana State Teachers College. After serving on the Federal Board for two years he resigned and returned to Indiana as president and treasurer of a printing company. Other than growing up on a farm and being state superintendent of public instruction in a state which passed a law in 1913 (Stimson & Lathrop, 1942) which required agriculture (or industrial arts) to be taught in the seventh and eighth grade of all common schools, Greathouse appears to have had no great connection with agriculture.

The organizational plan included provision for a director and assistant directors, field agents, and special agents for each of the vocational areas. The director would nominate people for the subordinate positions. In addition to the Agricultural Education Service, the Board also established the Trade and Industrial Education Service, Home Economics Education Service, and Commercial Education Service, there was also a Division of Research and a Clerical and Fiscal Service.

Nine days after the first meeting, the board of directors met with Charles Prosser to explore the possibilities of him becoming the director of the administrative staff. He was their unanimous choice for the director's position (Barlow, 1967). Since Prosser had written most of the Smith-Hughes Act and had been active in getting the legislation passed, members of the board believed he would be able to get vocational education started on the right foot. Prosser was, at that time, director of the Dunwoody Institute in Minneapolis. Prosser agreed to the position after securing a two year leave of absence and assumed his new position effective August 15, 1917.

The assistant director for agriculture was Layton S. Hawkins. The regional agents for agriculture were: North Atlantic States, Raymond W. Heim; Southern States, C. H. Lane; East Central States, J. A. Linke; West Central States, J. R. Cramer; and Pacific States, W. G. Hummel (Linke, 1942).

> Among the duties of the agents were: to work with State boards for vocational education in setting up programs of agricultural education in secondary schools, developing plans for agricultural education, and making studies and gathering information regarding methods adopted by State boards and local schools; to inspect federally aided programs to determine whether they were in keeping with the law and the policies promulgated by the Federal Board for Vocational Education; to hold conferences with representatives of State boards on administrative policies and professional activities; to work with State directors and supervisors in improving standards in supervision and teacher training; and to audit State accounts for vocational education to see if Federal funds were expended in accord with the law and the State plans.
> (Linke, 1942, p. 502-503)

Decisions and Contributions of the Board

In addition to the legislative mandate that required the Board to carry out the provisions of the Smith-Hughes Act, it also administered the provisions of the Civilian Vocational Rehabilitation Act passed in 1920. The Board administered Federal vocational legislation until 1933.

Several publications were made by the Board. One was a monthly magazine entitled The Vocational Summary which was published from May 1918 to July 1921. The Vocational Summary shared information about Board activities and national issues on vocational education. Some of the topics covered in volume one, issue one, May 1918 included relation of Smith-Hughes to Smith-Lever Act, vocational work for Negroes makes good progress in South, and a list of publications of the Federal Board (The Vocational Summary, 1918).

The Vocational Summary printed what was to become the FFA motto almost nine years before the FFA was established. L. S. Hawkins, (1919, p 1) chief of the division of vocational education sent "A Holiday Message to Real Americans" which stated:

> Christmas marks the birth of a new spirit in the world-the spirit of service. To the women, girls, men, and boys who are seeking to prepare and perfect themselves for service, I address this motto as embodying the Christian spirit.

Learning to Do.
Doing to Learn.
Earning to Live.
Living to Serve.

Examples of some of the early Board rulings included:

> The agricultural fund is allotted to the States on the basis of rural population. Nothing is said as to where the States shall spend the money. May it be spent for agricultural education in communities of more than 2,500 people? . . .
>
> Answer. The Census Bureau, in compiling the population of the United States has classified as urban population that residing in cities and places of 2,500 inhabitants or more, and as rural that residing in the remainder of the country. Although the allotment of money to the States is based on this classification, there is nothing in the statutes that requires the funds appropriated for agricultural schools to be spent in communities of less than 2,500 . . . (Bulletin No. 1, 1917, p. 39).
>
> May Federal moneys under the Nelson Act and Federal moneys under the Smith-Hughes Act be used for the maintenance of the same teacher-training classes in agriculture?
>
> Answer: Yes; but no Federal moneys expended under the Nelson Act can be used to match Federal moneys under the Smith-Hughes Act. For every dollar of national funds expended by the State under the Smith-Hughes Act, the State or local community, or both, must expend an equal amount for the maintenance of the same class or classes. Such fund must be used in accordance with the laws and regulations governing that fund (Bulletin No. 1, 1917, p. 40).

Demise of the Federal Board

A scandal almost destroyed the Federal Board at an early time in its history. The Rehabilitation Act guaranteed vocational training to men injured while completing military service. On July 11, 1919 the Rehabilitation Act was amended putting the entire responsibility for determining eligibility of the disabled men for the program with the Federal Board (Holt, 1922).

On February 16, 1920 the New York Evening Post began a series of scathing articles written by reporter Harold Littledale that eventually led to a Congressional investigation on the Board's mismanagement of retraining for disabled World War I veterans. The series began with the comments: "Fourteen months after the armistice 75 per cent of the soldiers, sailors, and marines disabled in the war instead of being on the road to rehabilitation, as Congress intended they should, are waiting for the machinery to move. That machinery is the Federal Board for Vocational Education" (Disabled Soldiers, 1920, p. 1). The series documented several personal cases with descriptive anecdotes of long waits and suffering.

The Littledale series even accused Charles Prosser of "double dipping" with the federal payroll. The reporter first noted a federal statute which prevented an individual from receiving two salaries and it was noted that Prosser had done just that when the rehabilitation work was added to his regular Federal Board work (Be Hard Boiled, 1920) The practice was quickly dropped.

From July, 1917 to October 10, 1933 the Federal Board for Vocational Education administered agricultural education provisions of the Smith-Hughes Act and subsequent legislation. Several attempts were made to merge the Board with other groups but none succeeded until the great depression hit. In an effort to save money and become more efficient the Congress on June 30, 1932 passed an act which allowed the President to reorganize government offices by executive order. The Congress had to approve of the changes within 60 days (Hawkins, Prosser, & Wright, 1951). On December 9, 1932 President Hoover proposed to abolish the Federal Board for Vocational Education and transfer its responsibilities to the Department of the Interior where the Office of Education was located. Congress did not approve of this change.

When Franklin D. Roosevelt assumed the presidency in 1933 the same cry for economy in the government was raised. On June 10, 1933 he issued an executive order which transferred to the Secretary of the Interior the functions of the Federal Board for Vocational Education. The members of the Federal Board would remain in an advisory capacity with no compensation. This order went into effect on October 10, 1933. Harold Ickes, Secretary of the Interior, transferred the vocational education responsibilities to George Zook, Commissioner of Education. Both men pledged support for vocational education. Several of the professional staff of the Federal Board moved to the Department of interior to carry on their work (McCarthy, 1950). In 1939 the U. S. Office of Education was transferred to the Federal Security Agency (Linke, 1942). For 11 years after the transfer to the Department of Interior, the advisory board met four times per year.

All appointive members of the Board submitted their resignations after the functions of the Board were transferred to the Department of the Interior. Roosevelt did not appoint replacements until August 4, 1935. The appointed members served without salary, attended the meetings regularly, and freely gave of their time. The cabinet members who were on the Board attended infrequently and generally sent a staff member to represent them.

Several of the professional staff of the Federal Board moved to the Department of Interior to carry on their work (McCarthy, 1950). In 1939 the U. S. Office of Education was transferred to the Federal Security Agency (Linke, 1942). For 11 years after the transfer to the Department of Interior, the advisory board met four times per year.

In 1946 President Truman reorganized the government. Section B of his Reorganization Plan No. 2 stated "The Federal Board for Vocational Education and its functions are abolished" (Hawkins, Prosser, & Wright, p. 159).

Conclusions and/or Recommendations

The Truman decree abolished the Federal Board, although it had not acted in its originally intended capacity for 13 years. The Board greatly assisted federally funded vocational education including agricultural education get off to a good start. It helped interpret the provisions of the Smith-Hughes Act, although in a somewhat strict constructionist mode. Having one of the 1914 Commission members and author of the Smith-Hughes Act, Charles Prosser, as director undoubtedly helped encourage such conservative interpretations.

The Board had its controversies and detractors. Overall, it accomplished its mission. Perhaps because it accomplished its mission so well and so quickly, its lifespan would logically be a short one.

While public education is primarily the function of the individual states, a Federal presence has generally helped agricultural education. Precedents from the Federal level have given a degree of uniformity across the states and have occasionally served as a model for agricultural educators.

At an early time in the history of agricultural education the Federal presence was in the United States Department of Agriculture. With the passage of the Smith-Hughes Act that presence shifted to the Federal Board for Vocational Education. Eventually the Federal presence was through the Bureau of Education and then through the United States Department of Education. By 1946 the Federal Board was eliminated. Agricultural education and vocational education have had a declining Federal presence ever since. Today contemporary agricultural educators may have to make fundamental decisions about how much of a Federal presence they want and where they believe it should be located. The Federal Board is one example of what it could be like.

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WHO'S IN CHARGE HERE?

AN ANALYSIS OF THE LEADERSHIP IN AGRICULTURAL EDUCATION PROVIDED BY THE NATIONAL COUNCIL FOR AGRICULTURAL EDUCATION

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WHO'S IN CHARGE HERE?
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INTRODUCTION

Whose should provided the leadership for the agricultural education profession? That question has taken on additional importance during the past six months. In September of 1992, officials in the USDA informally raised the question of whether the federal leadership had ever considered moving to the USDA. That question prompted a meeting of representatives of the agricultural education family at the Dulles Airport near Washington, DC the weekend of October 23-25, 1992.

During the last part of the meeting the focal point changed. Instead of continuing the discussion of looking at the advantages and disadvantages of moving to USDA and what was expected of the federal government in regards to agricultural education, the focus shifted to some rather pointed questions about the current leadership situation in agricultural education. There were come concerns and confusion about exactly who is providing leadership at the national level for agricultural education. Some of the questions raised were:

- What exactly are the official responsibilities of the current agricultural education specialist who are employed by the United States Department of Education?
- What exactly is the AERO group that is functioning with the FFA center and are the members of that group working harmoniously?
- What exactly is the current role of the National Council for Agricultural Education?
- Is the current role of the Council an appropriate role?
- What was the Council's original charge?
- Is there a need for both a National Council for Agricultural Education and the AVA Agriculture Division Policy Committee?

Before the profession can fully consider the question of a move to the USDA, it is important that it first get its own house in order in regards to questions about the leadership for the profession. In this paper, the leadership role of the National Council for Agricultural Education will be examined. Another paper in this group will look at the leadership of agricultural education as provided by the Department of Education. Since the AERO organization is an informal group composed of the chief operating officer of the agricultural education related organizations such as the FFA Alumni and National Young Farmer Education Association that meets primarily for communication purposes, it will not be addressed in this paper.

PURPOSE AND OBJECTIVES

The purpose of the research was to analyze the leadership provided to the agricultural education profession by the National Council for Agricultural Education. Specific questions answered were:

1. Why was the National Council for Agriculture Education started?
2. What are the objectives of the Council?
3. What were the specification contributions of the National Council to the development and growth of agricultural education?
4. What are the implications of these findings for agricultural education today?

THEORETICAL FRAMEWORK

The theoretical basis for this research is the philosophy of essentialism. Essentialists believe that educated people will have a solid knowledge of basic facts; especially as they relate to events of the past and to scientific principles. As people are faced with new decisions and choices, they can rely on this knowledge to guide then in making informed, intelligent decisions. The call for agricultural literacy in Understanding Agriculture New Directions for Education is based in part upon this philosophy. Citizens of the future need to possess a basic understanding of agriculture if they are to make intelligent decisions in regards to consumer choices and agricultural policy. It is just as important that agricultural educators have a knowledge of the past leadership provided by the United States Department of Agriculture if they are to make wise decisions regarding the professions' leadership.

METHODS AND PROCEDURES

Historical research methods were used to accomplish the objectives of the study. Both primary and secondary sources were used to obtain the information needed. Primary sources included publications from the National Council plus minutes from other professional organizations in agricultural education, AVA records and eyewitness accounts of the events by the researchers. Secondary sources included journal articles. All sources were subjected to internal and external criticisms.

RESULTS AND/OR FINDINGS

When Neville Hunsicker joined the United States Department of Education in 1952 there were 12-15 agricultural education specialists in the Department. These federal employees were generally regarded as the national leaders for agricultural education. When Hunsicker retired in 1979 there were only two agricultural education specialist in the Department of Education (Hunsicker, 1992). The steady erosion of the federal agricultural education leadership in the U.S. Department of Education was of grave concern to the profession at the end of the 70's.

Another concern facing the profession was the campaign pledge of the newly elected President, Ronald Reagan. He had campaigned to abolish the Department of Education. The threat of dismantling the Department coupled with the steady erosion of agricultural education specialist positions within the Department provided the impetus for development of a new leadership mechanism for the agricultural education profession (Case and Rawls, 1989). This new leadership mechanism was called The Council for Vocational and Technical Education in Agriculture.

The Council concept was developed under the leadership of Byron Rawls, Program Specialist for agriculture in the Department of Education. A meeting of representatives from the various constituencies of agricultural education was held at Farm Land Industries in Kansas City during the Fall of 1982 to discuss ideas and plans for the proposed Council (Guilinger, 1989). The concept was extensively discussed during the AVA convention that December. An ad hoc study committee functioned during 1983 to further refine the plans. The proposed Council plans received a positive reception from the profession at the AVA convention in 1983. Accordingly, the National Council for Vocational and Technical Education came into existence on December 12, 1983 (Pope, 1989). Ironically, the person who was the driving force behind the development of the Council, Byron Rawls, had retired in August of 1983 during a "reduction in force" period in the USDE. This left one "acting" and one permanent agricultural education specialist in the USDE. There was indeed a need for a new leadership mechanism in agricultural education. The organization of The Council could have not come at a more appropriate time.

In the Articles of Incorporation the purposes of the Council (1983, p. 1) were "to provide leadership, coordination and resources for the total educational process in vocational and technical education in agriculture." Five specific objectives were listed for the Council (p. 2):

1. Serve as an advocate at the local, state and national levels.
2. Involve industry in evaluating and developing quality instructional programs and processes.
3. Provide a forum in which the profession of agricultural education can address issues and develop solutions to problems of common concern.
4. Provide and maintain a structure to search out supporting resources.
5. Identify and coordinate the manpower necessary to carry out high quality programs.

Pope (1987, p. 16) wrote that the Council "Encourages and facilitates all constituencies in agricultural education to participate constructively in the

1.) Identification of important issues in public school education in agriculture,
2) Investigation, study, and debate of issues, and
3) Formation of policy and program recommendations."

At times the council has been referred to as a "think tank" (Pope, 1987) and as a "forum" (Between Issues, 1988). The Council is governed by a 12 member board of directors who represent all segments of the agricultural education profession. In 1990 the name of The Council was changed to the National Council for Agricultural Education.

Accomplishments of the Council

The Council has been the catalyst for a number of projects that have impacted on agricultural education. Some of these include:

National Study for Agricultural Education in Secondary Schools. This National Academy of Sciences study provided recommendations for program improvement to the profession. This study caused the profession to take a long hard look at where it should be going. The report of the study group, Understanding Agriculture New Directions for Education, was the basis for curriculum and program changes in a number of states.

National Summit on Agricultural Education. The first national summit examined the mission and goals of agricultural education and developed a strategic plan to accomplish those goals. The profession was forced to think about where it should be going and how it should get there.

National Task Force on Supervised Agricultural Experience. This task force examined the whole concept of SAE and developed a new model and materials for use in conducting SAE programs.

National Task Force on Agriscience and Emerging Occupations and Technologies. A national conference was held in October of 1988 to examine how high technology, science and business concepts could be integrated into the agricultural education curriculum.

National Task Force for Postsecondary and Adult Education in Agriculture. A national conference for leaders in postsecondary and adult education in agriculture was conducted in October of 1986.

The Council has been engaged in a number of major curriculum development initiatives in areas such as agrimarketing, aquaculture, water quality and agriscience. The council has also looked at legislative needs of the profession.

CONCLUSIONS AND RECOMMENDATIONS

It appears The Council is doing what it was designed to do. It has addressed major issues that need to be addressed. Instead of looking at the status quo, it has aggressively focused on the future. It has reached the goal described by Pope (1989, p. 18) "to give leadership that highlights futuristic planning and design, to stimulate creativity, develop fresh initiatives and create a climate for renewal in agricultural education."

The type of leadership provided by The Council has been different than that provided by U.S. Office of Education and the Federal Board for Vocational Education. These two groups initially focused more on policies, rules and regulations. These two entities had a legislative mandate to insure the federal laws regarding vocational education were being followed properly. The leadership provided by the Council is closer to that provided by USDA in the early days of agricultural education--one of stirring up, pointing the way, and providing materials to help. Currently there is a high degree of cooperation between the Council and the USDA. The USDA funding of Council projects probably exceeds the amount of non-formula money being spent by the USDE on agricultural education. It is somewhat ironic that the first curricula in agricultural education was developed by USDA and now some of the current and futuristic curriculum thrusts are again being sponsored by the USDA via the Council.

The Council is providing a unique style of leadership that is valuable to the profession and should continue to do so.

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WHO'S IN CHARGE HERE?

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INTRODUCTION

Over the decades the question of where should the national leadership for agricultural education be located and how should it be structured has been discussed and debated. In 1981 Blanton and Russell debated whether the federal leadership should be located in the Department of Education or Agriculture. In 1951 the NVATA was against a proposal to move the federal leadership of agricultural education to the Department of Agriculture. The administration of agricultural education was examined by federal leaders during the great depression. Even before passage of the Smith-Hughes Act, the question of whether federal leadership in agricultural education should reside with education or agriculture was discussed (Commission on National Aid to Vocational Education, 1914).

The issue of national leadership in agricultural education has recently risen to the surface again. A "hurry-up" meeting was called the weekend of October 23-25, 1992 at the Holiday Inn Dulles Airport outside of Washington, D.C. to discuss the question. Representatives from all segments of the agricultural education family were there. The specific question being considered was, "Should the federal leadership in agricultural education consider moving from the U.S. Department of Education to the U.S. Department of Agriculture?" In an informal discussion in September of 1992, officials in the USDA had asked if the idea had ever been considered. After some initial informal discussions, it was decided to explore the issue further. That was why the meeting was called. The Dulles group met for a second time at AVA in St. Louis.

In view of the current deliberations of the Dulles group regarding moving the Department of Agriculture and the change in the presidency of the United States along with the attendant rumors that all vocational education programs will be moved to the Department of Labor, it would be propitious to examine the issue of national leadership in agricultural education from a historical perspective. Santanya said, "Those who do not remember the past are condemned to repeat it."

There have been four distinct eras of national leadership in agricultural education. At the turn of the century, the educational leadership was slow to promote agricultural education. The USDA stepped in and provided the national leadership. The USDA established a Division of Agricultural Education in 1906 to provide national leadership in agricultural education. The leadership provided by the USDA lasted until 1929.

After the passage of the Smith-Hughes Act, national leadership was provided by the Federal Board for Vocational Education. There was strong consensus that agricultural education should not be administered through the Bureau of Education. The Federal Board was reduced to an advisory role during the great depression and federal leadership in agricultural education was transferred to the Commissioner of Education. The span of time covered by the Federal Board was from 1917 to 1933.

From 1933 until the present time, federal leadership in agricultural education has remained in the federal agency charged with administering education programs (over the years this has included the Department of the Interior; Federal Security Agency; Department of Health, Education and Welfare; and Department of Education).

As the federal presence in vocational education waned during the early 1980s, the profession established a National Council for Agricultural Education in an effort to develop a vehicle for providing national leadership. This era officially started in 1984 and continues today.

This paper focuses on the first era, that of the United States Department of Agriculture. It would be wise to examine the era and evaluate the outcomes of that era. This type of analysis could have an impact on the current deliberations about where leadership in agricultural education should be located. Manuscripts addressing the other three eras have been submitted to this conference.

PURPOSE AND OBJECTIVES

The purpose of the research was to analyze the impact of the United States Department of Agriculture on the development of agricultural education. Specific questions answered were:

1. What type of leadership has been provided by the USDA in regards to the development and continued growth of agricultural education.
2. What were the specification contributions of the USDA to the development and growth of agricultural education?
3. What are the implications for today?

THEORETICAL FRAMEWORK

The theoretical basis for this research is the philosophy of essentialism. Essentialists believe that educated people will have a solid knowledge of basic facts; especially as they relate to events of the past and to scientific principles. As people are faced with new decisions and choices, they can rely on this knowledge to guide then in making informed, intelligent decisions. The call for agricultural literacy in Understanding Agriculture New Directions for Education is based in part upon this philosophy. Citizens of the future need to possess a basic understanding of agriculture if they are to make intelligent decisions in regards to consumer choices and agricultural policy. It is just as important that agricultural educators have a knowledge of the past leadership provided by the United States Department of Agriculture if they are to make wise decisions regarding the professions' leadership.

METHODS AND PROCEDURES

Historical research methods were used to accomplish the objectives of the study. Both primary and secondary sources were used to obtain the information needed. Primary sources included publications of the U. S. Departments of Agriculture and Congressional records. Secondary sources included journal articles, and books. All sources were subjected to internal and external criticisms.

RESULTS AND/OR FINDINGS

At the turn of the century the U.S. Department of Agriculture, under the leadership of A. C. True, started providing national leadership for agricultural education. Starting in 1895, Dr. True, Director of the Office of Experiment Stations, started making speeches, writing articles in the Yearbook of Agriculture, and engaging in correspondence calling attention to the need for instruction in agriculture in the public schools (Moore, 1986). In 1901 the USDA entered a more active phase in regards to the promotion of agricultural education. Dick Crosby was hired as a special assistant to A. C. True to work with agricultural education (True, 1929). Crosby engaged in numerous activities to promote agriculture. A Division of Agricultural Education was established in the Office of Experiment Stations in 1906 (Lane, 1942). The division had a number of employees and was very active in supporting the development of agricultural education.

A reorganization of the USDA in 1915 resulted in the formation of a States Relations Services (SRS) which had a Division of Agricultural Instruction (U.S. Department of Agriculture, 1963). This Division continued to provide leadership for the development of agricultural education. When the Smith-Hughes Act was passed a number of employees (for example C. H. Lane and H. P. Barrow) and some of the functions of the State Relations Service of USDA were transferred to the Federal Board for Vocational Education. However, the SRS continued its agricultural education division. Shinn (1942, p. 574) reported that "The division of agricultural instruction of the United States Department of Agriculture was discontinued in 1929 after having made substantial contributions to the teaching of agriculture in both secondary and elementary schools in the country." What were these contributions?

The USDA made the following contributions to agricultural education between 1901 and 1929.

Forced the National Education Association (NEA) to recognize agricultural education. At the turn of the century the NEA was dominated by educators who were not overly sympathetic toward agricultural education. A common feeling among agriculturists was that the NEA had "not recognized agricultural education in a sufficient degree." (Office of Experiment Stations, 1906, p. 47). In 1907 Crosby led the successful effort to establish a Department of Rural and Agricultural Education with the NEA. This provided a platform within NEA for the promotion of agricultural education (Moore, 1986).

Developed sample courses of study to be used in teaching agriculture. Wheeler (1948, p. 53.) reported that Crosby was "largely responsible for the curriculum development" in the congressional district agricultural schools that were established in 1907 in Georgia. Entire courses of study in agriculture were developed by the USDA along with specialized curricula in subjects such as animal science and agronomy. As states began developing high school programs in agriculture, they looked to the USDA for assistance in curriculum development. The Division of Agricultural Education cooperated with the Southern Commission on Accredited High Schools to develop a four year course of study for accredited high schools in the South.

Prepared bulletins and instructional materials for teachers. The USDA started publishing bulletins related to agricultural education in 1905 with "The Teaching of Agriculture in the Rural Schools." The bulletins that followed were varied but many pertained to teaching technical subject matter (Ekstrom, 1969). A sampling of the bulletins include School Lessons on Corn, Free Publications of the Department of Agriculture Classified for the Use of Teachers, A Working Erosion Model for Schools, Collection and Preservation of Insects and Other Material for Use in the Study of Agriculture, and How to Test Seed Corn in School. Numerous other bulletins were published that were designed to promote and improve the teaching of agriculture.

Prepared lantern slides, film strips, photographs, charts and motion pictures for use by agricultural teachers. The USDA prepare large quantities of visual aids for use by agricultural teachers. C. H. Hansen, prepared a complete lantern slide series dealing with the teaching of agriculture in the public schools (Lane, 1942). Even after the Federal Board for Vocational Education came into existence, the USDA continued producing visuals for use by agriculture teachers (Shinn, 1942).

Started regional conferences for agricultural educators. In 1913 the Office of Experiment Stations started the plan of calling annual conferences for state supervisors and teacher educators in the North Atlantic, Southern and Central regions (Lane, 1942). Conover (1924, p. 69) reported that "At these and numerous other personal conferences the federal staff members would five the conferees the advantages of their knowledge of educational practices in various schools, and would suggest plans for making their studies production of immediate results home-project work was especially encouraged. These conferences were followed up through correspondence, personal advice, and materials for use in teaching."

Maintained a card index of practically all secondary agricultural programs in the United States. The USDA knew where agricultural education was being taught (Conover, 1924). A 1912 USDA bulletin "Institutions in the United States Giving Instruction in Agriculture" was a listing of every secondary program in the nation.

Prepared status reports on the development of agricultural education. Between 1910 and 1914 the division of agricultural education was charged with preparing an annual report of progress in agricultural education. (Lane, 1942). The information from these annual reports was generally reported in the Yearbook of Agriculture.

Published a periodical for agricultural educators. Between January of 1915 and December 1916 Agricultural Education Monthly was published every month except for the summer months. This publication provided suggestions on both the pedagogical and subject matter aspects of teaching agriculture (Lane, 1942).

Taught experimental courses. Conover (1924) reported that the Office conducted experimental courses in agriculture and shared the results with the schools.

Recent Activities of the USDA in Regards to Agricultural Education

During the past few years the USDA has began to take a renewed interest in agricultural education. The National Research Council study of agricultural education was jointly sponsored by the USDA. Recent curriculum projects conducted by The Council for Agricultural Education such as those in aquaculture and water quality have been supported financially by the USDA.

CONCLUSIONS AND RECOMMENDATIONS

Many people erroneously believe agricultural education was *started* when the Smith-Hughes Act of 1917 was passed. However, two years before the passage of this act, 90,708 students in 4,665 high schools were enrolled in agricultural classes (U.S. Bureau of Education, 1915). If the Smith-Hughes Act started agricultural education, how can agriculture in all these schools be explained? It was primarily through the efforts of the United States Department of Agriculture.

Visionary, energetic leadership for agricultural education was provided by the USDA during the first quarter of this century. The USDA championed the cause of agricultural education. It had not been an easy fight. Many educators and even some farmers had been resistant to the movement (Fuller, 1982, Cremin, 1961, Krug, 1964, Danbom, 1979). In the words of A. C. True (1907), there was a need for "agitation." The USDA provided this agitation. Not only did they agitate, they provided the courses of study, the curriculum, instructional materials and leadership. True (1929, p. 330) described his office as "a clearinghouse of information and advice regarding the courses, personnel, equipment, illustrative material, and literature for secondary instruction in agriculture." In one year alone, True's staff traveled 38,000 miles and visited schools and attended educational gatherings in 28 different states in their quest to develop agricultural education (Conover, 1924).

A comparison of the activities of the U.S. Bureau of Education in regards to the promotion of agricultural education pales when compared to that of the USDA during the same time span. While the Bureau of Education did publish some bulletins regarding agricultural education prior to the passage of the Smith-Hughes Act, their efforts started substantially later than those of the USDA and were small and not overly enthusiastic. The decision contained within the Smith-Hughes Act to create a separate Federal Board for Vocational Education to administer federally funded vocational education is a reflection of the lack of effort expended by the Bureau of Education to provide leadership for agricultural and vocational education.

In analyzing the actions of the USDA in regards to providing leadership for agricultural education in the public schools, one should realize the effort was primarily of a voluntary nature. The USDA did not have federal funds to dangle in front of schools as an incentive to start agricultural education programs. Also the USDA was not operating from a federal mandate. The closest it had to a federal decree was the "aid in acquiring and diffusing among the people of the United States useful and practical information on subjects connected to agriculture." language of the Hatch Act of 1887 (United States Statutes at Large, 1885-1887). The leaders in USDA saw a need and had a vision. The leadership literature tends to indicate that this is the purest form of true leadership.

The leadership provided by the USDA carried over into the Federal Board for Vocational Education. In 1913 Crosby, who headed up the USDA agricultural education effort resigned and was replaced by C. H. Lane who had joined the USDA Division of Agricultural Education in 1911. Lane transferred to the Federal Board in 1917 and was a regional agent for three years before becoming chief of the agricultural education section of the Federal Board. He remained in this position until 1934. Many of the activities conducted by the Federal Board for agricultural education were merely the continuation of activities started by the USDA.

Times change. Whether or not the federal leadership in agricultural education should once again reside in the USDA can not be accurately determined solely by looking at the past. There are a variety of factors to consider. However, when one examines the downhill slide in the leadership provided agricultural education under the Department of Education (as documented in the third paper of this group) it is not difficult to realize that it really couldn't get much worse.

In the 1960s, many agriculture departments displayed a series of slogans that were provided by Purina. One stated "What you have done in the past, indicates what you can do in the future." If this is true, then the agricultural education profession would be wise to pursue a move to the United States Department of Agriculture as quickly as possible.

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WHO'S IN CHARGE HERE?

AN ANALYSIS OF THE LEADERSHIP IN AGRICULTURAL EDUCATION PROVIDED BY THE UNITED STATES DEPARTMENT OF EDUCATION

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WHO'S IN CHARGE HERE?
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INTRODUCTION

During the recent presidential campaign, rumors out in the field began to surface that if Bill Clinton were elected president, the federal leadership in vocational education would be shifted from the Department of Education to the Department of Labor. Larry Case (1992) confirmed that the rumors had also been floating around in Washington. The reasoning was that Bill Clinton and other education labors favored the use of apprenticeships in vocational education. Since the Department of Labor had a division of apprenticeships and were already conducting apprenticeship programs, it would be logical to move vocational education there.

The possibility of moving vocational education to the Department of Labor had previously been a topic of discussion in the early 80's; but for a different reason. The newly elected president, Ronald Reagan, wanted to dismantle the Department of Education. Agricultural education along with other vocational programs were looking around for possible homes.

The question of where should the national leadership for agricultural education be located and how should it be structured has been discussed and debated from time to time for a variety of reasons (for examples see Blanton, 1981; Russell, 1981). The election of Bill Clinton and recent overtures from the United States Department of Agriculture (USDA) about moving the federal leadership of agricultural education has caused the profession once again to address the question. However, before any type of position or action is taken, it would be wise to examine the current federal leadership situation in agricultural education. The federal leadership in agricultural education has resided in a Bureau, Office or Department of Education since 1933 (Linke, 1942). How has agricultural education fared in the Department of Education?

PURPOSE AND OBJECTIVES

The purpose of the research was to analyze the impact of the United States Department of Education (USDE) on the development and growth of agricultural education. Specific questions answered were:

1. How did agricultural education come to be administered by the Department of Education?
2. What type of leadership has been provided by the USDE in regards to the development and continued growth of agricultural education
3. What were the specification contributions of the USDE to the development and growth of agricultural education?

4. What are the implications for today?

THEORETICAL FRAMEWORK

The theoretical basis for this research is the philosophy of essentialism Essentialists believe that educated people will have a solid knowledge of basic facts, especially as they relate to events of the past and to scientific principles As people are faced with new decisions and choices, they can rely on this knowledge to guide then in making informed, intelligent decisions. The call for agricultural literacy in Understanding Agriculture New Directions for Education is based in part upon this philosophy Citizens of the future need to possess a basic understanding of agriculture if they are to make intelligent decisions in regards to consumer choices and agricultural policy It is just as important that agricultural educators have a knowledge of the past leadership provided by the United States Department of Education if they are to make wise decisions regarding the professions' leadership.

METHODS AND PROCEDURES

Historical research methods were used to accomplish the objectives of the study Both primary and secondary sources were used to obtain the information needed Primary sources included publications of the U. S. Departments of Education and Congressional records. Secondary sources included journal articles and books All sources were subjected to internal and external criticisms.

RESULTS AND/OR FINDINGS

The reason the federal leadership of agricultural education resides in the Department of Education is because of financial exigency resulting from the great depression The early leaders in vocational education never intended for agricultural education to be administered through the Department of Education.

During the early formative years of agricultural education, the United States Department of Agriculture had voluntarily provided the leadership for agricultural education (see the first manuscript of this group for details). When the Smith-Hughes Act was passed a decision had to be made regarding where to officially locate the leadership for the four areas of vocational education (industrial education, home economics education, commercial education and agricultural education) mentioned in the legislation

During the hearings leading up to the passage of the Smith-Hughes Act it became obvious that the Commission of Education, Philander P Claxton, did not have much knowledge of vocational education, particularly agricultural education, and really didn't show much inclination toward vocational education (McCarthy, 1950) Claxton's testimony before the Commission on National Aid to Vocational Education revealed that his knowledge of agricultural education was limited primarily to vegetable gardening

(Commission on National Aid to Vocational Education, 1914). The Congress of the United States decided the Bureau of Education should not provide the federal leadership for vocational education. Accordingly, a separate Federal Board for Vocational Education was established to administer vocational education. Barlow (1967, p. 115) indicated, ". . . the attitude of the Commissioner of Education, Philander P. Claxton, contributed toward establishing an independent board . . ." Claxton's views toward vocational education were typical of many school administrators (Gibson, 1910). The proponents of vocational education were afraid that vocational education would not develop and grow if it was turned over to the "educators."

Vocational education prospered and grew under the leadership of the Federal Board for Vocational Education (see the 2nd paper in this series). When the great depression hit during the 1930's, the government looked for ways to save money and streamline the operation of the government. On June 10, 1933, Franklin Roosevelt issued an executive order transferring the functions of the Federal Board for Vocational Education to the Office of Education which was located in the Department of the Interior. This order went into effect on October 10, 1933 (Hawkins, Prosser and Wright, 1951). Many of the employees of the Federal Board moved to the Office of Education. Since that time the federal leadership for agricultural education has been housed in the federal agency responsible for education (The Office of Education was transferred to the Federal Security Agency in 1939, to the Department of Health, Education and Welfare in 1953, and became the Department of Education in 1980.).

By the time the administration of vocational education was moved to the Office of Education, vocational education had become firmly established in the schools. The operating policies and procedures were in place and it was largely business as usual for vocational education. The employees of the Federal Board continued their same activities in the Office of Education. For all practical purposes, you couldn't tell a difference.

Some of the specific activities of the Office of Education in regards to agricultural education include:

Supervision. The supervisory functions of the Federal Board continued in the Office of Education. Agricultural education specialists within the Office of Education reviewed state plans in regards to agricultural education, received state reports, checked expenditures, designed reporting forms, and made supervisory visits out in the field (Stevens, 1967). The regional office concept re-emerged (it was first used between 1918 and 1920 by the Federal Board) and agricultural education specialists were located in regional offices. The federal officials were regarded as being the national leaders in agricultural education. For several decades, there were typically five federal officials in primary supervisory roles (Vocational Agriculture Education Directory, 1939). In 1939 these included J. A. Linke (Chief), C. H. Lane (North Atlantic), D. M. Clements (Southern), J. H. Pearson (North Central) and W. T. Spanton (Pacific).

Subject Matter Specialists. The practice of having subject matter specialists was started in 1929 with the Federal Board and continued with the Office of Education. For example in 1939 there were five agricultural education specialists in the Office of Education. They were F. W. Lathrop (Research), H. B. Swanson (Teacher-Training), W. A. Ross (Subject Matter), R. W. Gregory (Part-Time and Evening) and W. N. Elam (Special Groups). Ten years later, the number of specialists had increased to six (Office of Education, 1949). They were H. B. Swanson (Teacher-Training), A. H. Hollenberg (Farm Mechanics), E. J. Johnson (Program Planning), R. E. Naugher (Part-time and Evening), A. W. Tenney (Subject Matter) and W. N. Elam (Program Planning). These specialists promoted their field of responsibility and developed materials for use by teachers and others.

Publications. The personnel in the Office of Education continued the practice of publishing bulletins. Many of the bulletins were revisions of bulletins published during the Federal Board era but there were some new bulletins. A sampling of the bulletins published by the Office of Education include:

Teaching Farm Credit - 1934
Summaries of Studies in Agricultural Education - 1935
Business Problems in Farming - 1936
Agricultural Education Organization and Administration - 1939
The Advisory Council for a Department of Vocational Agriculture - 1951
Instruction in Farm Mechanics - 1957
Inservice Education of Teachers of Vocational Agriculture - 1959
Buildings, Equipment, and Facilities for Vocational Agriculture Education - 1960
Agricultural Education: The Preparation of Teachers - 1962
Objectives for Vocational and Technical Education in Agriculture - 1965

Annual Regional Conferences. The practice of having regional conferences for teacher educators and state supervisors that was started by the USDA and continued by the Federal Board was continued by the Office of Education. At these conferences the federal agent would bring an update and pertinent topics were discussed.

Special Conferences. From time to time special conferences were sponsored by the Office of Education to examine critical issues in agricultural education. For example the National Seminar on Agricultural Education in Transition in May of 1971 was held in Denver and was sponsored by the Office of Education.

Special Projects. A number of special research projects have been sponsored by the Department of Education. Examples include the National Agricultural Occupations Competency Study conducted by David McClay in 1978 and the Standards for Quality Programs in Agricultural/Agribusiness Education in 1977. The Office of Education jointly funded the National Research Council study of agricultural education is secondary schools that was completed in 1988.

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WHO'S IN CHARGE HERE?
AN ANALYSIS OF THE LEADERSHIP IN AGRICULTURAL EDUCATION

A Critique of Four Papers

Historical research represents a departure from the traditional form of research usually presented at our meetings. The study of our past and our roots is an area that is investigated by too few of our colleagues. Understanding the past is every bit as important as understanding the present if we are to plan for the future.

The researchers have undertaken to research the leadership in Agricultural Education in what they have divided into four periods. Given the space and time constraints of this conference, they have done a good job of condensing events of these periods into the four papers. The introductions were well laid out, although I have some difficulty equating the National Council with the governmental agencies cited in the other papers. The purposes and objectives were clear and the conclusions and recommendations were for the most part based on the data collected from the study.

The theoretical base raises some question. I have difficulty understanding how the philosophy of Essentialism could provide the basis for a historical study of agricultural education. Our theories have always been grounded in the Progressivism of John Dewey rather than the Essentialism philosophy of Charles Prosser.

The data were collected using both primary and secondary sources. Although there were several primary sources, I would have preferred to have had the majority be primary sources. The problem with secondary sources is that all too often the data collected by the researcher are conclusions drawn by someone else. This tends to prejudice the conclusions drawn by the researcher.

One of the difficulties of historical research both from the stand point of the researcher and the consumer of the research is that of researcher bias. In other forms of research this phenomenon is always present, but is more easily dealt with. As with most researchers, those conducting historical research begin with an agenda they wish to prove or disprove. The very nature of historical data collection makes this form of research difficult to remove bias. Given this assumption, I offer a few suggestions for the researchers.

We should keep in mind that at the time of the passage of the Smith Hughes Act all of education was in the process of dramatic change. The twenty years before and the twenty years after the turn of the twentieth century defined and established most of the components and structure of public education as we know it today. Vocational education was a *component* of that educational system and agricultural education was a *component* of vocational education. My point is that we should be careful not to give too much emphasis to the part played by agriculture in the structuring of vocational education. For example the move to create a separate governing board for vocational education was due in a large part to the influence of the powerful National Association of Manufacturers who wanted to control vocational education and do all the teaching in their factories. Their idea was to control the labor unions through vocational education. Obviously the American Federation of Labor opposed the measure and the separate board was worked out as a compromise. We must also realize that at the time the agricultural interests were divided over the form agricultural education should take.

I would like to have seen more attention paid to the area of implications. What have we learned from these experiences? How can we benefit from these experiences as we plan the future of Agricultural Education? Is there an implication from the research as to where our leadership should now be housed?

In summary I feel these were interesting papers that should give us several "points to ponder". I realize that the time and space allocations made it difficult to address my concerns.

Additional Papers Accepted for Publication in the Proceedings

EQUINE FACILITATED THERAPY: A CENSUS OF PROGRAMS IN PENNSYLVANIA

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INTRODUCTION AND THEORETICAL FRAMEWORK

Horses have been a part of human life from the very beginning of time. The horse has served humanity in many ways: including work, worship, transportation and war. Mention of riding for people with disabilities can be traced through the centuries. In early Greece, horseback riding was prescribed to improve the morale of otherwise untreatable people. In the 1600's daily riding was recommended for cases of gout; and. August Tissot, physician, insisted that it cured symptoms of tuberculosis. European medical writings as early as 1735 contain information on medical use of the horse (Ruddock, 1992). Research traced to 1875 in France shows that movements of the horse improve posture, balance, joint movement, and muscle control as well as morale in humans (Cusack, 1988). However, therapeutic horseback riding programs were not started until the middle of the 1900's (Depauw, 1986). Horseback riding as a form of therapy has developed in many countries in the past 30 years. These programs were instituted in Europe and spread to the United States in 1967 (Brock, 1988). Today there are more than 450 programs operating in North America (Ruddock, 1992).

The following classifications reflect the three primary fields of therapeutic riding and their different orientations (NARHA, 1992). Many programs utilize all three classifications in their delivery and instructions, however, they can be practiced individually. Sport- This includes riding, driving and vaulting as types of recreation and competition. Education- There is emphasis to incorporate cognitive, behavioral, psychological and physical objectives in the program using riding, vaulting and driving as the vehicle. Medicine- Physical, occupational, and recreational therapists combine therapeutic exercise and related activities with the movement of the horse. Psychological specialists take advantage of the human-animal bond and developmental theory to treat individuals with emotional and psychological disabilities. Therapeutic riding or Equine Facilitated Therapy (EFT) uses equine-oriented activities for the purpose of contributing positively to the cognitive, physical, emotional, and social well-being of people with disabilities.

PURPOSE & OBJECTIVES

Since EFT began in the United States, it has gained increasing support and participation. While Pennsylvania has many active and quality EFT programs, specific programmatic characteristics are not known. There is a need to identify baseline characteristics of existing programs to inservice existing programs and commence new programs. This study will identify administrative, programmatic and facility characteristics of therapeutic riding programs in Pennsylvania. The specific objectives of this study are:

1. To identify and describe the administrative characteristics of therapeutic riding programs in Pennsylvania.

2. To identify and describe the programmatic and facility characteristics of therapeutic riding programs in Pennsylvania.

METHODS AND PROCEDURES

This study utilized a descriptive-survey research design with the scope limited to all EFT programs in operation during spring of 1992 in the state of Pennsylvania. A total of 57 programs were identified. The survey instrument for the study was designed to solicit administrative, programmatic, and facility characteristics. It contained two sections, section one elicited information pertaining to program and administrative characteristics. Section two elicited information pertaining to facility characteristics.

The survey instrument was reviewed by individuals in the Department of Agricultural and Extension Education at the Pennsylvania State University and the Pennsylvania Council of Horseback Riding for the Handicapped for content and face validity.

Data Collection and Analysis - The data were collected using the self administered instrument over an eight week period during the summer and fall of 1992. An initial, follow up mailing and telephone request yielded 35 usable responses (61% return rate). Results are categorized into administrative, programmatic and facility characteristics. Descriptive statistics including frequency distributions, means, medians and percentages were utilized. Where appropriate median scores served as the measure of central tendency since the data was skewed some in response categories (Huck, Cormier, & Bounds, 1974). All data was coded and processed using the statistical package for the social sciences version 4.1 (SPSSx) available through the computation facilities of The Pennsylvania State University.

RESULTS

Administrative Characteristics - Administrative characteristics refers to information about employees and volunteers, type of insurance, non-profit status, length of operation and other administrative data. Responses related to membership in state and therapeutic riding associations revealed that 91% are Pennsylvania Council of Horseback Riding for the Handicapped members and 74% are North American Riding for the Handicapped Association members. Data revealed that 32% of the programs are registered as 4-H clubs and 43% of programs have riders with disabilities that are 4-H members.

While many programs have been in operation over two decades and others are just beginning, the average number of years Pennsylvania EFT programs have been operating is 8, with a range of 1 to 21 years. Information was collected relative to the amount of time spent on EFT tasks. Table 1 summarizes the median number of hours as well as the range spent per week for select EFT tasks.

Table 1. Hours spent on tasks per week in Pennsylvania EFT program (N=35).

	Hours Spent Per Week	
Task	Median	Range
Actual EFT Lesson Time	9.0	11-67
Educational & Professional Development of Staff	1.0	1-20
Administrative Duties	4.0	1-30
Preparation for Lessons	2.0	1-10
Facility Maintenance	3.5	1-80
Care of Horses	14.0	1-84

Of the tasks in Table 1, care of horses requires the most time per week with an median number of 14 hours per week and EFT lesson time is the second most time consuming task with an median number of 9.0 hours per week. Even though Pennsylvania winters are less than desirable at times for riding, 40% of the programs operate their programs year round. The ability to serve riders during the winter months was most likely possible since one half of the programs (54%) reported having indoor arenas. April through October are the peak months for program operation. During the month of June, 32 of the 35 programs were in operation.

NARHA is the national association for therapeutic riding and provides accreditation for quality programs, instructor training and insurance to EFT programs. Based upon the responses in this survey, 18 programs are NARHA accredited; 8 are not

NARHA accredited; 6 have pending NARHA accreditation status and 3 did not respond. Insurance is a very important factor in EFT; of the programs responding, 13 reported using NARHA liability insurance; 3 reported 4-H liability insurance; 3 reported other sources of liability insurance; 5 reported a combination of liability insurance; and 2 reported no liability insurance. Nine programs provided no response to the question. Slightly over one quarter of the programs (26%) utilized third party (insurance) billing for EFT services. Therapeutic riding is and can be a medical, educational and/or physical "prescription" and most programs charge a fee for their services. Nearly three fourths (71%) of the programs reported a charge for their EFT services with $18.00/hour reported as the average fee.

Coordination and administration of an EFT program is very important for it's success and development. Over three fourths (80%) of the programs have either a board of directors or an advisory council. To ease operation costs two thirds (63%) of the programs were registered with the IRS as a non-profit organization. Even with non-profit status many programs could not operate without support of the local community in the form of donated supplies, equipment and even horses. Table 3 summarizes the status of donated services and supplies utilized by EFT programs in Pennsylvania.

Table 3: Services and supplies donated to EFT programs in Pennsylvania (N=35)

Type of Donation	No. of programs utilizing donations**	No. of programs not utilizing donations
Horses	27	7
Feed	27	7
Tack	22	12
Veterinary Care	10	24
Facilities	14	20
Barn Equipment	17	17
*Other	14	20

*Services and supplies listed as other include things such as farrier service and trucking.
**Numbers vary due to missing data.

Many EFT programs receive referrals, services and funds from special interest organizations. For example, the Easter Seal Society or Association for Retarded Citizens may supply riders, services and/or funds to a local EFT program. Table 4 describes program cooperation with special interest groups. Mental Health/Mental Rehabilitation organizations supplied 12 programs with riders. The Pennsylvania Easter Seal Society, United Cerebral Palsy and Association for Retarded Citizens organizations each supplied riders to 10 programs. Organizations supplying the most funds were Pennsylvania Easter Seal Society and Mental Health/Mental Rehabilitation.

Table 4: Cooperation with special interest organizations. (N=35)

	Number of Programs Receiving		
	Services	Riders	Funds
PA Easter Seal Society	4	10	7
United Cerebral Palsy	0	10	3
Mental Health/Mental Rehab	4	12	8
Office for Vocational Rehab	3	3	1
Local School District	4	7	4
Association for Retarded Citizens	3	10	5

Volunteers - Programs were asked to provide information related to volunteer numbers, recruitment, recognition and training. Within the 35 programs responding, the following number of volunteers were identified: 384 female adult volunteers, 349 youth (under 18 years) female volunteers, 201 male adult volunteers, and 153 youth male volunteers (Table 5). Females represented the majority of volunteers in these programs. Over half of the programs reported that some of their volunteers are 4-H members and 4 programs reported that some of their volunteers are FFA members.

Table 5: Total number of volunteers reported in EFT programs (N=35)

	TOTAL	MEDIAN	RANGE
Adult Males	201	3	0-70
Adult Females	384	10	0-50
Youth Males	153	2	0-60
Youth Females	349	8	0-60
TOTAL	1087		

EFT administrators reported several different strategies for recruiting volunteers for their programs. The majority of programs either utilized the media, printed or verbal, and word of mouth to recruit volunteers. Use of 4-H/FFA clubs was only mentions by 4 programs. One program had the luxury of having a full time volunteer coordinator and another got volunteers from the county judicial system. Individuals caught DUI were given the option to do community service work at the program.

Programs sought to recognize volunteers with a variety of items. All programs reported on going rewards in the form of praise and acknowledgment. Special events such as banquets, picnics, certificates and T-shirts were practiced by a majority of the programs. Ten programs provided volunteers with "free" riding time in the form of lessons and/or trail rides.

Once individuals agree to volunteer it is important that they receive training related disabilities and/or horses. Several programs noted they utilized one on one sessions with volunteers, while others sent volunteers to specific EFT training sessions. However, the majority of programs (78%) reported holding several training sessions per year for volunteers.

Programmatic Characteristics - Information was solicited about number of riders served by Pennsylvania EFT programs. The 35 programs reported that 1393 individuals were served by EFT(table 6). Ages of riders ranged from 1 -77 years of age. The average age of the youngest rider was 4.7 years and the average age of the oldest rider was 47.1 years.

Table 6. Frequency of riders served by EFT in Pennsylvania by gender and age. (N=35)

	Median	Range	Total
Adult Female	4.0	1-38	207
Adult Male	5.5	1-63	301
Youth Female	8.0	1-60	392
Youth Male	10.0	2-79	493
		TOTAL	1393

Programs were asked to provide information related to the primary disability of riders in their programs (Table 7). Almost 9 out of 10 programs (86%) reported riders riders with cerebral palsy. This was also the most frequently occurring disability served by EFT with 274 individuals served by EFT. The next most common disability served was Down's Syndrome, with two-thirds of the programs reporting riders with Down's Syndrome. Disabilities served by at least 50% of the programs include: head trauma (54%), spina bifida (54%), mental retardation (mild 54%, moderate 60%, severe/profound 57%), attention deficit disorder (54%) and emotionally disturbed (54%). Almost one-sixth of the programs (18) reported serving other disabilities. The majority of the programs did not report specific disabilities. Programs that did provide specific disabilities reported many rare and infrequently occurring diseases such as: Rhett's Syndrome, Prader Willi Syndrome, Williams Syndrome, etc.

Table 7: Summary of riders in EFT programs in Pennsylvania by primary disability. (N=35)

Primary Disability	Number of Programs Serving	Sum of riders Programs
Amputation	7	11
Arthritis	5	7
Arthrogryposis	4	4
Blindness	17	29
Cerebral Palsy	30	274
Cerebrovascular Accident	12	34
Deafness	12	20
Down's Syndrome	22	103
Epilepsy	7	18
Head Trauma	19	79
Multiple Sclerosis	8	16
Muscular Dystrophy	9	20
Polio	2	2
Sickle Cell Anemia	2	2
Spina Bifida	19	41
Spinal Cord Injury	9	12
Scoliosis	3	4
Kyphosis	2	3
Lordosis	2	4
Mentally Disabled (Retarded)		
Mild	19	110
Moderate	21	132
Severe/Profound	20	101
Learning Disabled-Attention Deficit Disorder	19	105
Autistic	16	61
Emotionally/Behaviorally Disturbed	19	147

Therapeutic Vaulting and Driving - Only 4 programs offered therapeutic driving. Programs that offer therapeutic driving have an average of 3.6 participants. Five programs offered remedial vaulting. The average number of vaulting participants per program offering vaulting is 5.

Facility Characteristics - Facility characteristics included physical facilities of the program as well as horses and equipment characteristics. Over three-fourths (80%) of programs have wheelchair accessible bathroom facilities. Eighty-six percent have wheelchair accessible entrances and exits. One-fifth (20%) have wheelchair accessible corridors, and one quarter (23%) have wheelchair accessible water fountains. Over half (51%) have wheelchair accessible telephones.

Table 8: Specialized/adaptive equipment used by EFT Programs (N=35)

Equipment	Percent Using
Safety helmets	97%
Safety stirrups	83%
Devonshire stirrups	71%
Mounting ramp	91%
Mounting block	86%
Ladder reins	77%
Doweled reins	16%
Vaulting surcingle	71%
Safety belt	63%

Table 8 reports the type and amount of adaptive equipment used in EFT. Safety helmets are used by 97% of the programs and 9 out of 10 programs use a mounting ramp to assist riders in mounting and dismounting. Specialized stirrups, reins and mounting equipment are also widely used. Nearly three-quarters (71%) utilize vaulting surcingles. A vaulting surcingle is a leather strap similar to a girth that encircles the horse and has handles or rigid straps located on either side of the withers that allow riders to grip as they ride.

The median number of horses used by EFT programs in Pennsylvania is 6 with a range of 0 to 24. The median number of ponies used for EFT in Pennsylvania was reported to be 3 per program with a range of 0 to 11. Horses used in EFT programs had an average age of 14.4 years with a range of 2 to 20 years. A range of 1 to 25 years of age was listed for ponies with an average of 16.2 years. Almost 9 out of 10 programs have an outdoor arena and lightly over one half (54%) have an indoor arena(s).

Program responses about owning, renting, borrowing and leasing horses, equipment and facilities appear in table 9. Nearly 60% of programs own their own EFT horses. Over half (57%) noted they own their equipment. However, many programs reported renting, borrowing, or leasing facilities for EFT.

Table 9: EFT program characteristics by ownership status. (N=35)

	Own*		Rent*		Borrow*		Lease*	
	Yes	No	Yes	No	Yes	No	Yes	No
Horses	20	12	4	28	11	21	7	25
Equipment	24	18	3	29	5	27	4	28
Facilities	12	20	7	25	7	25	6	26

*Numbers vary due to missing data.

CONCLUSION

The results of this study provided baseline administrative, program and facility characteristics of EFT programs in Pennsylvania. Information gathered will be used to direct existing inservice programs for EFT and assist in the development of new programs. Additionally, results of this study will be shared at the state and national level with organizations for individuals with disabilities, school districts and funding agencies to further promote and support EFT. While the data gathered is descriptive in nature and reflects the organization and administration of EFT in Pennsylvania it can be interpreted and applied toward opportunities for secondary agricultural education programs and 4-H clubs.

Opportunities for Agricultural Education Programs - Equine Facilitated Therapy offers agricultural youth organizations many educational and community service opportunities. Volunteering as a club or on an individual basis in an EFT program provides youth with exposure to and experience working with individuals with disabilities. This level of interaction can be a tremendous growth experience when students learn to place the person before their disability.

In addition to increased awareness about disabilities, many occupational opportunities are available within an EFT program. Career options available range from riding instructor to program administrator, physical therapist, and/or special education instructor. While there is exposure to many careers in an EFT program, students also realize the importance of volunteers to the viability and success of a program. The 35 programs in the study reported a total of 1087 individuals volunteering their time. Of that 1087 almost 50% were youth under 18 years of age. Over 50% of the programs reported that some of their volunteers came from 4-H clubs and 11% noted some of their volunteers were FFA members. EFT programs could not exist without the assistance of individuals who volunteer their time

EFT programs can serve as the focus for community service activities for FFA and/or 4-H chapters, fundraising efforts and can serve as career exploration sites for students. Additionally, EFT programs have many operational and administrative functions that could meet the Supervised Agricultural Experience component of an agricultural education program or a 4-H project. SAE/4-H project opportunities exist in care and maintenance of the horses and facilities, serving as a volunteer for the lessons, assisting with the educational aspects of a program to helping with administrative duties. All individuals involved in EFT benefit, it is truly therapy for all .

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AN EVALUATION OF THE MASTER GARDENER PROGRAM IN ARKANSAS

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INTRODUCTION

The Master Gardener (MG) program began in Washington State in 1972. The purpose of the program, accomplished through the use of volunteers, is to increase the availability of horticultural information to the public while helping to free Extension personnel to spend time on other programs. These volunteers are given 30-70 hours of extensive training in areas such as botany, plant pathology, entomology, pesticides, propagation, pruning, and soils as well as horticulture. Volunteers are expected to work an equivalent number of hours in return to Extension programs over a year's time.

Training is usually conducted by the land grant university faculty and Extension personnel, although as the program progresses, many veteran Master Gardeners teach the new recruits as part of the volunteer service. Due to time constraints, most of the course work is presented from slides, but some agents have recognized the value of field trips and other hands-on-experiences for teaching (Delate and Tucker, 1985, p. 353). Materials for the course are contained in a Master Gardeners handbook. After successfully completing the training and examination, they become certified Master Gardeners. The Cooperative Extension Service recognizes their efforts with a Master Gardener certificate and name badge (Carson, 1992).

Volunteers to this program come from all walks of life--students, housewives, retirees, and farmers are just a few of the people that have joined this program. With such a diversity of people, it is only natural that they volunteer their time in many different ways to repay their debt to the Cooperative Extension Service. One of the most helpful ways that a volunteer can repay time is through responding to telephone requests for information. According to Wesenberg and Whiting, "...statistics show that the number of questions answered by the MG volunteers under the leadership of a MG Assistant is ten times greater than what one extension agent alone could have directly answered" (1977, p. 2). Usually, Master Gardeners spend half of their time on the telephone answering the public's questions and the remainder of the time on community service projects including but not limited to community gardens, public programs, and plant clinics.

The Arkansas Master Gardener program, introduced in a pilot program in Pulaski and Jefferson counties in 1988, has 366 graduates from programs in 11 counties (Lee, 1992). All counties participating in the program have a major urban center within their boundaries. The program in Arkansas consists of 40 hours of training with an equal amount of payback time.

PURPOSES AND OBJECTIVES

Since a statewide evaluation of the Master Gardener program had not been completed, the purpose of this study was to determine the perceptions of the Arkansas Master Gardener graduates concerning the overall value, usefulness, coverage, and interest in the program. To accomplish this purpose, the following objectives were developed:

1. To determine demographic characteristics of the Arkansas Master Gardener participants.

2. To determine perceptions of the program concerning the efficacy of training, personnel, materials, and equipment.

3. To determine whether Master Gardener graduates were involved in a professional horticultural occupation.

4. To determine if there is a relationship between educational training and the perceptions of the overall program by its graduates.

5. To determine if there is a relationship between the activity status (active versus inactive) of the Master Gardeners and perception of the overall program.

6. To determine factors which motivate or inhibit participation in the Master Gardener program.

7. To solicit opinions of Master Gardener participants concerning modifications to the current program.

8. To form recommendations for the Master Gardener coordinator to improve the quality of the program.

METHODS AND PROCEDURES

The population for this study consisted of all the Master Gardener graduates in Arkansas, a total of 366 people from 11 counties. The list of Master Gardener counties was obtained from Master Gardener Coordinator in Arkansas. A list of Master Gardener graduates was compiled by contacting each county having a Master Gardener program. The survey questionnaire was developed by the researcher after extensive review of other questionnaires and was previewed, revised, and test validated.

A cover letter and copy of the questionnaire was mailed on April 10, 1992, to the 366 graduates of the program. Included in the questionnaire packet was a self-addressed stamped envelope to facilitate return of the surveys. Packets were numbered with a three digit number on the outside of the mailing envelope, the return envelope, and the survey so that the names could be pulled off the master list as the surveys were returned, enabling the researcher to conduct follow-up mailings. A follow-up postcard was sent on May 4, 1992. Of the 362 deliverable surveys, a total of 237 were returned, for a return rate of 65.5%.

Since this was a census study, only descriptive statistics were used to report the findings. The level of significance was assigned to a .05 level for this study.

RESULTS AND FINDINGS

The results of this study will be reported according to the study objectives.

Objective 1: To determine demographic characteristics of the Arkansas Master Gardener participants. Eighty one (35.8%) of the respondents had completed MG training in 1991, followed closely by 75 (33.2%) in 1990. More than half of the respondents (56.6%) were either completing the first year of training or in a recertification program. Twenty-seven (29.4%) were currently in recertification for the Master Gardener program. Some 62 (27.2%) respondents indicated that they had completed the first year of training and volunteer service period required while 49 participants (21.5%) had completed the first year of training but not the volunteer service period. Thirty-six (15.8%) indicated that they were currently enrolled in the first year program.

The majority of the Master Gardener respondents were white (95.3%), female (65.0%), and over 61 years of age (33.3%). The largest single percentage of respondents were employed full-time (29.6%), with an almost equal number not employed (28.8%) or retired (20.6%).

Over half of the respondents had a post-secondary education with 32.5% holding a Bachelors degree. The largest percentage of respondents (30.6%) had a yearly income larger than $50,000. Teaching (12.7%) was the major occupational background of the respondents followed by medicine (11.4%) and sales (9.7%).

Almost 70% of the respondents were currently active in the program, with 79.9% intending to remain active next year.

Objective 2: To determine perceptions of the program from Master Gardener graduates concerning efficacy of training, personnel, materials, and equipment. All questions pertaining to this objective were rated as means on a scale of 1.0=Poor to 4.0=Excellent.

The Master Gardener respondents rated the value of the overall program with a mean value of 3.65, the mean value of the program to them as a gardener as 3.53, the value to the Extension Service as a mean of 3.41, and its value to the community as a mean of 3.46.

The effectiveness of the oral presentations received during the Master Gardener training sessions had a mean value of 3.38 and the effectiveness of printed materials used were rated as a mean of 3.66.

Respondents rated the **coverage** of soils, insect problems, plant diseases, landscaping/maintenance, pruning, ornamental trees and shrubs, weed control, and communication skills lower than the **usefulness and interest** in these topics. Participants found that their **interest** in plant propagation, houseplants, vegetable gardening, small and tree fruits, and lawn and turf care lower than the **usefulness and coverage** in these topics. Vegetable gardening **usefulness** had the highest mean ($\underline{M}=3.67$) while plant propagation **coverage** had the lowest mean ($\underline{M}=2.88$). Overall, all means ranged from good to excellent, although the topic houseplants had the lowest overall group means than the other subjects covered in the training. The mean scores are graphically shown in Table 1.

Insert Table 1 here

Objective 3: To determine whether Master Gardener graduates are involved in a professional horticultural occupation. About one-fourth of the Master Gardener respondents had never been employed in a horticultural occupation (73.0%). Of those replying that they had been involved in a horticultural occupation, 21 (33.3%) had been employed for more than five years, 16 (25.4%) had been employed for 3-4 years, 14 (22.2%) had been employed from 1-2 years, and 10 (15.9%) had been employed for less than one

Objective 4: To determine whether there is a relationship between educational training and the perceptions of the overall program by its graduates. Five levels of training were identified for this study: first year, quit training, trained-no volunteer service, trained-completed volunteer service, and recertification. Overall means were calculated for each training level group of the value, usefulness, coverage and interest in the program. It was found that the value (M=3.70), usefulness (M=3.64), coverage (M=3.44), and participant's interest (M=3.36) in the program were ranked significantly higher overall by the currently enrolled participants in the program than by the other respondents.

Those who ranked the **value** of the program significantly lower were those participants who had completed the first year of training but did not complete the volunteer period (M=3.38) and those who had completed both the training and the volunteer period (M=3.41). Ranking the **usefulness** of the program lowest were those who began the training but did not complete it (M=3.23). Significant differences in the perceived **usefulness** of the program were also found by those who had completed the training and volunteer period (M=3.37) and by those who had completed the training but not the volunteer period (M=3.37) when compared to other groups.

Those who began the training but did not complete it ranked the **coverage** of the program the lowest (M=3.02). Significant differences were found between the groups who had completed the training but not the volunteer period (M=3.06), completed the training and the volunteer period (M=3.17), and those involved in recertification (M=3.19).

There was a significant difference between the **interest** in the program by the participants who were involved in recertification in the program (M=3.15). The overall means for this question are shown in Table 2.

Insert Table 2 here

Objective 5: To determine if there is a relationship between the status of activity of the Master Gardeners (active versus inactive Master Gardeners) and their perceptions of the overall program. Active Master Gardeners responding to these questions ranked the value (M=3.55), usefulness (M=3.45), and coverage (M=3.21) of the program higher than the inactive participants. Inactive participants ranked their interest (M=3.25) slightly higher in the program than the active members did (M=3.23). A significant difference was found in the value of the program among the active and inactive participants. Means for this question are reported in Table 3.

Insert Table 3 here

Objective 6: To determine motivational factors which stimulate Master Gardener volunteers to become involved in and to remain active in the program and identify possible inhibitors which discourage participants from remaining active. Master Gardeners stated that the main reasons they wanted to become a Master Gardener were: self-improvement (37.4%); a hobby (14.8%); to increase horticultural knowledge for my job (13.0%); and to help others (6.5%). Twenty nine respondents (12.6%) gave a variety of other answers which included: gaining knowledge, sharing with other gardeners, community service, for home garden use, and opportunity to restore the environment.

Self-improvement was the main reason for becoming a Master Gardener by 37.4% while hobby was the second most important reason (14.8%). To help others was listed by only 6.5%.

The respondents rated the benefits of program participation on a scale of 1 = most important and 7 = least important benefit. The most important benefit for these respondents was: 1) to learn about gardening followed by 2) it is an opportunity to help others. When participants were asked what would motivate them to become active in the program again, about one-third indicated that they needed more time. New priorities and difficulties balancing personal and work time were the answers most often given as reasons for not being active in the program.

Objective 7: To solicit opinions of Master Gardener participants concerning modifications to the current program. Five questions of the survey focused on possible ways to improve the Master Gardener program in Arkansas.

Overwhelmingly, these respondents (86.6%) felt an advanced Master Gardener program should be made available yet only 62.3% were interested in joining a statewide organization of Master Gardeners. They were mostly interested in periodical tours and field trips (68.2%) and monthly update classes (62.3%). More training (30.8%), specialized interest groups (15.4%), organized project development (11.5%) quarterly programs (11.5%) and product updates (7.7%) were the most frequent other suggestions. Regional, county, or area Master Gardener clubs was also listed as a choice.

Respondents indicated that they wanted more contact and organization of the training and activities in the program from the Extension Service, more training on organic gardening, longer training periods, periodic updates, more hands-on experience, and specialized interest training.

400

RECOMMENDATIONS

Volunteers serve as a valuable resource to any agency. Using volunteers to disseminate information from the University is indeed " an extension of the extension concept" of the land-grant system. Using trained master volunteers aids not only the extension agent but also the community and the individual. The Master Volunteer programs particularly the Master Gardener Program in Arkansas seems to be a wise investment of time and resources.

The following recommendations are given as suggestions for consideration to help improve and expand a most successful program. These recommendations are for the Arkansas Master Gardener program only and are not intended to reflect upon any other programs in other states.

The recommendations for improvement and/or further study are grouped into two main categories: training and service commitment to the program.

Volunteer Service Commitment

1. Participants in the program need more contact from the Cooperative Extension Service regarding volunteer work and activities. Agents need to dedicate time to planning and organizing activities for beginner volunteers and to make community contacts to assist volunteers establishing community based service activities.

2. Use the diversity of Master Gardener participants to the best advantage by giving them the opportunity to creatively pay back their time by allowing them to organize new volunteer projects.

3. Incorporate levels of Master Gardeners into the program to accommodate those who want to remain active in the program, yet cannot work the full amount of volunteer time due to full time jobs or other commitments. Some suggested ideas might be a Master Gardener Initiate, Certified Master Gardeners, Advanced Master Gardeners or Associate Master Gardeners. These titles would differ by the amount of training, volunteer service completed and the active participation after training.

Training

4. Advanced Master Gardener programs, specialized training sessions, monthly updates, and periodical tours and field trips should be offered.

5. Develop and incorporate more hands-on workshops and demonstrations using live specimens and techniques in training. In established programs the veteran Master Gardeners could be enlisted to teach these sessions.

6. Since a large proportion of Master Gardeners work full-time, allow more activities during night or weekends to accommodate their schedules.

7. More information on recommended plants and varieties for Arkansas' climate, plants native to the area, and specific area problems should be addressed in training sessions.

8. Organic gardening should be added as a subject taught in the training sessions.

9. Have training sessions over a longer period of time with shorter class times

to allow better learning of subject matter.

10. Evaluate and monitor speakers for clarity of presentation and level of instruction.

11. Some reorganization and indexing of the printed materials and the handbook would be of benefit for quick access to specific topics.

General

12. Introduce a "big brother" or "big sister" system within the Master Gardener program pairing a veteran Master Gardener with a new volunteer to ease transition into the program.

13. Encourage participants to become more involved in community activities, e.g. start a community experimental garden to promote awareness in the area.

14. The success of any program depends largely on the attitude and willingness of the agents to devote time to this program. The ratings and perceptions of the Master Gardener program varied from county to county in this study even though the structure of the program and training materials were the same in the state. Due to these perceived differences it is recommended that before any new programs are added in the future, administrators should ensure that there is adequate support staff in each county to administer the program and that the agents are interested in the success of the program.

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Table 1
Evaluation of Training Topics of the Master Gardener Program

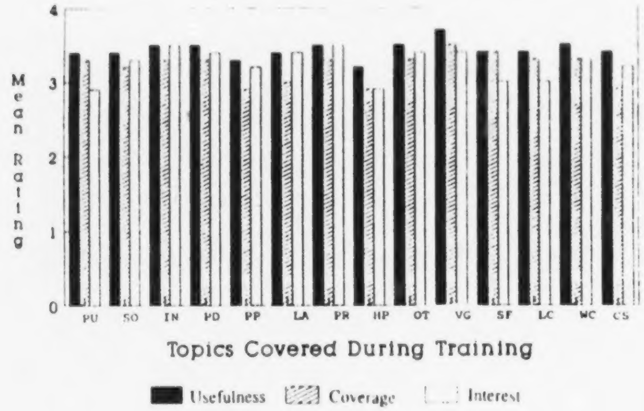

Table 2
Means of Participant's Perception of the Value, Usefulness, Coverage, and Interest in the Master Gardener Program by Educational Training

	Value	Usefulness	Coverage	Interest
1st Year	3.70^{a}	3.64^{a}	3.44^{a}	3.36^{a}
Quit Training	3.54^{ab}	3.23^{ab}	3.02^{ab}	3.30^{ab}
Trained-No Vol	3.38^{b}	3.37^{b}	3.06^{b}	3.28^{ab}
Train-Vol	3.41^{b}	3.37^{b}	3.17^{b}	3.21^{ab}
Recertification	3.52^{ab}	3.43^{ab}	3.19^{b}	3.15^{b}

$p < .05$ 1 = Poor 4 = Excellent

Table 3
Means of Master Gardener's Perception of the Value, Usefulness, Coverage, and Interest by Level of Activity in the Program

	Value	Usefulness	Coverage	Interest
Active	3.55^{a}	3.45^{a}	3.21^{a}	3.23^{a}
Inactive	3.36^{b}	3.39^{a}	3.16^{a}	3.25^{a}

$p < .05$ 1 = Poor 4 = Excellent

A DEMOGRAPHIC PROFILE AND ATTITUDINAL STUDY OF DONORS TO THE TENNESSEE 4-H PROGRAM

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INTRODUCTION AND THEORETICAL FRAMEWORK

Tennessee 4-H is a non-profit organization that has approximately 2,900 individual and corporate donors contributing to it. This study characterized a demographic profile of Tennessee 4-H donors and assessed some of the donors' attitudes about 4-H. These attitudes may be an indication why these donors chose to contribute to this particular non-profit organization.

With the passage of the Smith-Lever Act in 1914, 4-H and youth development became an integral part of the Cooperative Extension Service (Reck, 1952). Adults realized that youth needed a way to learn some of the life skills that would aid in developing them into useful, productive citizens.

The mission of 4-H is to "assist youth in acquiring knowledge, developing life skills, and forming attitudes that will enable them to become self-directing, productive and contributing members of society" (Wessel and Wessel, 1982). With the help of parents, volunteer leaders and a host of others, the 4-H mission is carried out. There are many ways that 4-H members experience the learn-by-doing educational process. Some of these include participation on judging teams, completing project book activities, and attending 4-H camps. Four-H is also involved in international programs and conferences. These along with national, regional, state, district, county, and local activities are helping youth develop and apply leadership skills, a positive self-concept, and respect and cooperation when working with others. The most recent statistics indicate there are approximately 5 million youth involved in the youth education program of the Cooperative Extension Service. Since 1914 over 40 million youth from all states, the District of Columbia, Puerto Rico, Virgin Islands, and Guam have participated in 4-H (Wessel and Wessel, 1982).

Today, 4-H continues to educate rural and urban youth about citizenship, leadership, and personal development with a variety of activities. To continue projects like those mentioned above and encourage and develop new activities, financial support is necessary to keep 4-H a leading youth organization. The State 4-H office and the Board of Directors of the Tennessee 4-H Club Foundation, Inc. indicated a need for a demographic profile of current donors to Tennessee 4-H. The Tennessee State 4-H staff, like the leaders in any non-profit organization, wanted to learn what motivates its donors to give. Specifically, there was a need to assess the attitudes of these donors and determine if there were relationships between these attitudes and their giving patterns.

PURPOSE AND OBJECTIVES

The purpose of this study was to identify demographic characteristics of the Tennessee 4-H donor audience and to study the relationships of these demographic characteristics to donors' attitudes about 4-H and their giving patterns to charitable organizations. The following objectives were developed to accomplish the overall purpose of the study:

1. to develop a demographic profile of 4-H donors by describing the following characteristics;

    A. gender
    B. age
    C. residence
    D. education
    E. involvement with 4-H
    F. employment status
    G. income
    H. philanthropic history

2. to study the relationships between the demographic variables and respondents' philanthropic giving patterns;
3. to study the relationships between the demographic variables and respondents' attitudes about 4-H; and,
4. to study the relationships between respondents' attitudes about 4-H and their philanthropic giving patterns.

METHODS AND PROCEDURES

Subjects

There were approximately 2,900 names on the donor and potential donor list to the Tennessee 4-H program. A random sample of 567 subjects was drawn from this list. The sample was comprised of 501 individual donors and 66 corporate donors. This sample size was adequate to allow for greater than 95 percent confidence in findings, assuming response was non-biased.

Instrumentation

After a review of pertinent literature, two questionnaires were developed consisting of four sections of an attitudinal and demographic nature. There were separate questionnaires for the individual and corporate donors. The questionnaires were color-coded to distinguish the difference between the two subgroups in the sample. The attitudinal questions were the same for the individual and corporate donors. However, the demographic questions varied between the two groups.

The first section of the questionnaire utilized a Semantic Differential scale to assess respondents' general attitude about 4-H. The second section was comprised of ten items related to donor attitudes about the objectives of the Tennessee 4-H program. A Likert scale was used to measure the respondents' level of agreement with these 4-H objectives which were taken from the Volunteer Leaders' Handbook for Tennessee (Foster and Henderson, 1986). The third attitude measure was constructed with another Likert-type scale. These statements were designed to study respondents' perceptions of the 4-H program's ability to effectively teach the various life skills. "Life skills" were identified in the questionnaire and explained and respondents were asked to indicate how effective individual 4-H activities were in teaching these life skills. Finally, the fourth section identified demographic characteristics of Tennessee 4-H donors and asked them to respond to several open-ended questions about 4-H.

Procedures

This research was completed by the use of a mail questionnaire. The questionnaire was examined by a panel of experts to increase content validity prior to mailing. Suggestions made by the panel and results of a pilot test were used to improve the instrument before it was mailed to the respondents. A cover letter was designed to explain the purpose of the study and to encourage participation. The questionnaires were coded for ease of data analysis; however, respondents were assured of confidentiality in their response. The questionnaire was mailed to each of the respondents and included a pre-addressed, stamped return envelope.

Follow-up procedures similar to those outlined by Dillman (1978), were utilized for non-respondents at the appropriate time. Approximately, two weeks after mailing the questionnaires, a second one was sent to non-respondents. The response rate was assessed after four weeks. There was a 31.6 percent response rate to the initial mailing. One hundred forty-eight individual and 31 corporate donors responded. The second mailing produced an additional 51 questionnaires for a total response rate of 40.6 percent. Of the 230 surveys returned, 15 were non-usable due to incomplete data. Therefore, 215 were used in the final analysis, making the overall usable response rate 37.9 percent. Although the response level was of some initial concern, an analysis of differences between early and late response failed to produce any evidence that early and late responders differed significantly, so additional mailings and/or phone follow-ups were not conducted as it was assumed that late responders were similar to non-responders (Goldhor, 1972). It was concluded that findings from this sample were generalizable to the larger population from which it was drawn.

RESULTS AND FINDINGS

The first objective was to develop a demographic profile of donors.

Individual Donors

Of the 177 individual donors responding, 65.2 percent were male. Respondents represented varying age groups. Only 7.3 percent were between the ages of 18 and 29 while the largest group of individual donors was between 30 and 44 years of age (33.3 percent), followed closely by those in the age range of 45-59 (31.1 percent) and 60 and over (27.7 percent). One respondent failed to answer this question.

Most individual donors lived on farms (37.3 percent). However, 33.9 percent also lived in cities. The remainder of those responding indicated they lived in towns (13.6 percent) or rural non-farm areas (14.1 percent).

Nearly 47 percent of these donors indicated they either held advanced degrees or had completed some study above the Bachelor's Degree, while 24.3 percent reported holding a Bachelor's Degree. Approximately 21 percent indicated they had completed some college and only 7.3 percent indicated they held a high school degree or less.

Individual donors were predominantly former 4-H members themselves (77.4 percent) and approximately 37 percent of them indicated their spouse also had been a member. More than half of them (55.4 percent) were currently, or had previously served as 4-H volunteer leaders and slightly fewer than 30 percent indicated their spouse had also served in this capacity. Slightly more than half (52.5 percent) were the parents or grandparents of 4-H members. However, fewer than 40 percent indicated their own parents had been volunteer 4-H leaders. Nearly all (93.8 percent) indicated they had either relatives, friends, and/or neighbors who had been either 4-H members or volunteer leaders. Approximately 38 percent indicated their employers had also served as 4-H volunteers.

Forty-eight percent of the individual donors were employed in agricultural careers while the remaining were in non-agricultural careers. Income ranged from less than $25,000.00 to $65,000.00 or more. However, most (44.6 percent) earned between $35,000.00 and $64,999.00. Regarding their philanthropic history, most indicated they gave to religious organizations (88.7 percent). Although many gave to other charitable and/or non-profit organizations, those most frequently identified were "educational organizations" (48.6 percent), "health organizations" (34.5 percent), and "scouts" (32.2 percent). Nearly 46 percent indicated they had given to 4-H within the last three years while approximately 6 percent indicated they had given within the past six years. The remainder had either not given to 4-H within the past 10 years or chose not to answer the question. The average number of times respondents had donated to 4-H within the past 10 years was 4.06 (s.d. = 7.65). The average amounts donated at the local, district, and state levels were $34.20 (s.d. = $75.52), $13.89 ($56.51), and $142.41 (s.d. = $957.63), respectively.

Approximately 46 percent of those responding indicated they contributed to a specific scholarship or fund. However, many (41.2 percent) chose not to answer this question. Only 27.7 percent of the individual donors indicated they had been contacted personally for a donation to the 4-H program. Fewer than 20 percent indicated they were contacted by mail. Nearly 42 percent of the individual respondents indicated a belief that 4-H should attempt a more aggressive fund raising effort and approximately 44 percent of them indicated they would contribute more if such an effort were initiated.

Corporate Donors

Respondents to the corporate donor survey were those individuals within the corporate structure responsible for philanthropic contributions. Of the 38 corporate donors responding, nearly 87 percent were male. Corporate respondents also represented varying age groups. However, they did not differ substantively from the private donors with regard to their reported age category.

The majority of corporate donors (57.9 percent) also indicated they had been 4-H members themselves and approximately 32 percent of them indicated their spouse also had been a member. Approximately 32 percent of them were currently, or had previously served as 4-H volunteer leaders and approximately 13 percent indicated their spouse had also served in this capacity. Approximately 34 percent were the parents or grandparents of 4-H members. However, fewer than 16 percent indicated their own parents had been volunteer 4-H leaders. Again, most of the corporate donors (84.2 percent) indicated they had either relatives, friends, and/or neighbors who had been either 4-H members or volunteer leaders. Approximately 60 percent indicated their employers or employees had also served as 4-H volunteers.

Nearly 53 percent of the corporate donors were involved with agricultural careers while the remaining were in non-agricultural careers. Philanthropic history of the corporate donors was somewhat more varied than the individual donors. Only approximately 29 percent reported giving to religious organizations. Fifty percent indicated they donated to educational organizations. The FFA was the most frequently identified other organization to which corporate donors contributed. Nearly 77 percent indicated they had given to 4-H within the last three years. The remainder did not answer this question. The average number of times corporate donors had donated to 4-H within the past 10 years was 11.97 (s.d. = 15.53). The average amount donated at the local, district, and state levels was $307.40 (s.d. = $553.08), $101.21 (s.d. = 220.69), and $868.10 (s.d. = 1896.01), respectively. It should be noted that several "outliers" donated from 5-to-10 thousand dollars which resulted in the high standard deviation in state-level contributions.

Exactly half of those responding indicated they contributed to a specific scholarship or fund. Approximately 47 percent of the corporate donors indicated they had been contacted personally for a donation to the 4-H program while approximately

32 percent indicated they were contacted by mail. Slightly fewer (36.9 percent) corporate donors indicated a belief that 4-H should attempt a more aggressive fund raising effort than did individual donors and approximately 32 percent of them indicated they would contribute more if such an effort were initiated.

The second objective was to study the relationships between demographic characteristics and the respondents' "philanthropic giving pattern". Philanthropic giving pattern was defined as "the sum total of all money given at all levels by each donor in 1990-91" The independent variables studied in the individual donor analyses were gender, age, residence, education, income level, and type of career (ag. vs non-ag. related). Of these independent variables, only education was significantly related to the amount of money given in 1990-91. As indicated in Table 1, generally, the higher the education level, the higher the average amount of money given (f=2.67 df=4,109 p=.036). However, the Duncan's Multiple Range test indicated that only those respondents having "some additional graduate study" (but less than a graduate degree) differed significantly from those having completed some college or those who held a high school diploma or less. (It should be noted that one outlying individual donor was not included in this analysis because his contribution did not reflect the norm of the group. This individual contributed $10,000.00 while all other individual contributions ranged from $0.00 to $1,000.00.)

The independent variables studied in the analyses of the corporate donors were gender, age of respondent, and type of career (ag. vs non-ag. related). None of these independent variables were significantly related to the amount of money donated to 4-H in 1990-91.

The third objective was to study the relationships between demographic variables and respondents' attitudes about 4-H. Attitude about 4-H was measured using three intervally scaled variables. The first was a six-item Semantic Scale with ratings for each item ranging from one to seven. Potential scores could range from six to forty-two with a score of six being most positive. The second dependent variable used in these analyses was a Likert scale assessing respondents' attitudes about the objectives for the Tennessee 4-H Program. There were 10 stated objectives, each having a 5-point rating scale beside it. Total scale scores could range from 10 to 50 with a score of 10 being the most positive attitude. The final dependent variable used in these analyses was a similar Likert-type scale which asked respondents to rate a set of 4-H activities regarding how effective they were in helping to teach one or more of a set of identified life skills. There were nine activities listed, each having a 5-point rating scale beside it. Scores could range from 9 to 45 with the most positive score being 9. The independent variables used in the analyses for individual donors were gender, age, residence, education, income, and type of career (ag. vs non-ag related). The only significant relationship which existed among any of these independent variables and dependent variables was the relationship between age and respondents' general attitude about 4-H as measured by the Semantic Differential Scale. As reported in Table 2, although all attitude scores were fairly positive, those individual donors in the age group of 30 to 44 were significantly less positive than those in the 18-29 year old group and the 60 year and older group (f=3.26, df=3,148, p=.023). However, it should be noted that although this relationship is significant, there is very little substantive difference between the scores of any of the four groups.

Similar analyses were conducted for the corporate respondents as those described above for the individual donors. The independent variables in these analyses were gender, age, and type of career (ag. vs non-ag related). Gender was significantly related to corporate donors general attitude about 4-H and their attitudes about the 4-H objectives. As indicated in Table 3, females were significantly more positive than were males regarding their general attitude about 4-H (t=3.34, p=.002). Further, females were significantly more in agreement with the stated 4-H objectives than were males (t=3.38, p=.002). Finally, as indicated in Table 4, corporate respondents who were in non-agriculturally related careers were significantly more in agreement with the 4-H objectives than were those in agriculturally related careers (t=3.22, p=.003) and respondents in non-agriculturally related careers also held a more positive attitude regarding 4-H activities' ability to teach life skills (t=2.23, p=.032).

The fourth objective was to study the relationships between respondents' attitudes about 4-H and their philanthropic giving patterns. There were only "low-to-negligible" relationships among these variables. Neither respondents' overall attitudes about 4-H, their attitudes about 4-H objectives, nor their attitudes about 4-H's ability to teach life skills accounted for more than one percent of the variance in total dollars donated in 1990-91, for individual or corporate donors.

CONCLUSIONS AND RECOMMENDATIONS

The results of this study indicate most of the donors to the Tennessee 4-H program have a generally high opinion of the organization, its objectives, and its ability to teach youth life skills. Although some statistically significant relationships exist between various demographic groups regarding these opinions, the differences are not substantive when one considers the overall possible scale ranges used in the study. However, many respondents indicated a need for a "modernizing", or "more contemporary changes" to the Tennessee 4-H program. This was indicated by numerous anecdotal notes and answers to open-ended questions on the questionnaires.

A surprisingly large percentage of both groups of donors held advanced degrees or had at least completed some college work above the Baccalaureate level. The majority of existing donors (both private and corporate) were former 4-H members themselves. However, only slightly more than half of the individual donors and only 34 percent of the corporate donors had children who were 4-H members. This may have long-term implications for a "shrinking" donor base unless increased efforts to seek donations from non-members can be successful.

An important finding is that many donors were receptive to the idea of a "more aggressive" attempt at fund raising for the organization. Individual donors were more receptive to this idea than corporate donors. However, a good number in both groups indicated they would consider giving more if such an effort were initiated.

Based on the findings from the study, the following are recommendations to the Board of Directors of the Tennessee 4-H Club Foundation, Inc.:

1. The Tennessee 4-H program should consider attempting a more aggressive fund raising effort. From the findings, it appears this effort may particularly be directed at reaching more individual donors.
2. Consideration should also be given to using more and varied techniques for identifying potential donors. Of those donors responding that had been contacted for a contribution, most indicated being reached by personal contacts. There should be other strategies developed for contacting donors and tracking potential donors. A mail or phone effort might be very successful with private donors.
3. It is strongly recommended that a donor data base be computerized and frequently updated. Throughout the study, much time could have been saved if the mailing list had been more up to date. Future fund raising efforts could be conducted much easier if a data base were established.
4. Based on the review of literature and study findings, additional corporate sponsorship should be sought from those corporations not already donating to Tennessee 4-H.

The following are recommendations for future research.

1. This study needs to be periodically replicated to continue to understand the demographic characteristics of the donors to the Tennessee 4-H program.
2. Further research should be conducted regarding the relationships between gender and attitude about 4-H.
3. Additional research should be conducted to determine if level of previous involvement in 4-H is related to philanthropic giving or attitudes concerning the Tennessee 4-H program.
4. A study of the "general population" of Tennesseans regarding their perceptions of the 4-H program may provide insight regarding the potential to expand the 4-H donor pool.

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Table 1. Average Amount (in dollars) Donated in 1990-91 by Individual Donors by Education Lever

Education Level	n	$\bar{x}$*
High School or Less	7	5.71A
Some College	22	42.27A
Bachelor's Degree	28	98.21AB
Advanced Degree	45	110.98AB
Some Graduate Study	12	190.83 B
TOTAL	114	

(f=2.67, df=4,109, p=.036)

*Means with the same letter beside them do not differ significantly as determined by using Duncan's Multiple Range Test.

Table 2. Average Attitude Scores For Individual Donors Regarding Overall Opinion About 4-H by Age

Age	n	$\bar{x}$*
18 to 29 years	11	12.18A
60 years or older	39	13.56A
45 to 59	48	15.29AB
30 to 44	54	15.80 B
TOTAL	152	

(f=3.26, df=3,148, p=.023)

*Means with the same letter beside them do not differ significantly as determined by using Duncan's Multiple Range Test.

Table 3. Average Attitude Scores For Corporate Donors Regarding Overall Opinion About 4-H and the 4-H Objectives by Gender

Variable Gender	n	$\bar{x}$	s.d.	t	p
Overall Opinion About 4-H					
Male	28	16.57	3.61	3.34	.002
Female	5	10.40	4.98		
4-H Objectives					
Male	32	18.06	3.29	3.38	.002
Female	5	12.80	2.78		

Table 4. Average Attitude Scores For Corporate Donors Regarding the 4-H Objectives and Ability to Teach Life Skills by Employment Status

Variable Employment Status	n	$\bar{x}$	s.d.	t	p
4-H Objectives					
Ag-Related	20	18.95	3.47	3.22	.003
Non-Ag Related	17	15.47	4.44		
Ability to Teach Life Skills					
Ag-Related	20	17.85	3.10	2.23	.032
Non-Ag Related	17	15.47	3.38		

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